

SONY

VTR IN CAMERA

BVW-D600

BVW-D600P

BETACAM SP™

Digital 1000

MAINTENANCE MANUAL

Volume 1 1st Edition (Revised 3)

Serial No. 10001 and Higher (BVW-D600)

Serial No. 40001 and Higher (BVW-D600P)

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X-RAY RADIATION WARNING

Be sure that parts replacement in the high voltage block and adjustments made to the high voltage circuits are carried out precisely in accordance with the procedures given in this manual.

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**S/N ; 10366 and higher (UC)
40166 and higher (EK)**

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- C. SEMICONDUCTOR ELECTRODES**
- D. SPARE PARTS AND FIXTURE**
- E. CHANGED PARTS**

SECTION 1

TECHNICAL INFORMATION

1-1. SPECIFICATIONS (for NTSC model)

(with standard playback machine)

(1) General

Power requirements

DC 12V (11V to 17V)

Battery pack NP-1B (Ni-Cd, 2.3Ah)

or NP-1A (Ni-Cd, 1.7Ah)

For AC operation: use optional AC-550 AC adaptor

Power consumption

25 W

(using a metal particle tape, 12V)

Operating temperature

0°C to +40°C

Operating humidity

Less than 85% (relative humidity)

Storage temperature

-20°C to +60°C

Mass

Approx. 5.0 kg

Battery pack

NP-1B, NP-1A: 0.7 kg

BP-90A, BP-90: 1.7 kg

Dimensions

132 x 208 x 370 mm (w/h/d)

(Not incl. projecting parts and controls)

Video cassette

1/2 inch, cassette tape for Betacam format

Metal particle tape

BCT-5M/10M/20M/30M or equivalent

Oxide tape

BCT-5G/10G/20G/30G or equivalent

Tape speed

Approx. 118.6 mm/sec

Recording playback time

More than 30 minutes (with BCT-30M)

F.FWD time

Less than 9 minutes (with BCT-30M)

REW time

Less than 5 minutes (with BCT-30M)

Continuous Operating time

Approx. 60 minutes (with NP-1B)

(2) CONNECTOR

AUDIO IN

CH-1/CH-2 (REAR)

XLR-3 pin (female)

GENLOCK IN

BNC

TC IN

BNC

TC OUT

BNC

VIDEO OUT

BNC

TEST OUT

BNC

EARPHONE OUT

Mini jack

PB ADAPTOR

20 pin

LENS

12 pin

REMOTE

6 pin

VF

20 pin

DC IN

XLR-4 pin

DC OUT 12V

4 pin

MIC IN (FRONT)

XLR-3 pin (female)

(3) CAMERA**CAMERA**

Imager 2/3-inch frame interline-transfer, Hyper HAD CCD

Imager configuration

RGB 3-CCDs

Spectral system

F1.4 prism system (with quartz filter)

Built-in filters

CC filter

ND filter

A: Cross filter

1: Straight through

B: 3200 K

2: 1/4 ND

C: 4300 K

3: 1/16 ND

D: 6300 K

4: 1/64 ND

Electronic shutter speed

- 1/100, 1/125, 1/250, 1/500, 1/1000, 1/2000 second
- 260 speeds from 60.1 to 7000 Hz (in CLS mode)
- 248 speeds from 30.4 to 58.3 Hz (in ECS mode)
- 1/60 second (in EVS mode)

Lens mount

Special bayonet type

Video output

1.0 Vp-p, 75 ohms, unbalanced,
sync negative, two outputs

Sensitivity

2000 lux with F8 (typical),
89.9 % reflection chart

Minimum subject illumination

1.9 lux (at F1.4, +30 dB gain)

Video signal-to-noise ratio

62 dB (Y typical)

Horizontal resolution

850 or more TV lines (at center)

Registration

0.05 % or better for entire screen area
(excluding distortion due to lens)

Geometric distortion

None identified (excluding distortion due to lens)

Smear

-120 dB (Y typical)

VIEWFINDER

Picture tube

1 1/2 inch monochrome, quick start type
with BRIGHT control, CONTRAST control,
PEAKING control, TALLY switch,
ZEBRA switch, AUDIO IND switch,
AUDIO LEVEL CH-1 control (covered by the
guard cap)

Resolution

600 TV lines (at center)

(4) VTR

Video system

With a metal particle tape

Bandwidth

Luminance :

30 Hz to 4.5 MHz +0.5/-3.0 dB

Chrominance :

30 Hz to 1.5 MHz +0.5/-3.0 dB

S/N

Luminance :

More than 51 dB

AM :

More than 53 dB

PM :

More than 53 dB

DG

Less than 2 %

DP

Less than 2°

K-factor (2T pulse)

Less than 2 %

Y/C delay

Less than 20 nsec

With an oxide tape

Bandwidth

Luminance :

30 Hz to 4.1 MHz +0.5/-6.0 dB

Chrominance :

30 Hz to 1.5 MHz +0.5/-3.0 dB

S/N

Luminance :

More than 48 dB

AM :

More than 50 dB

PM :

More than 50 dB

DG

Less than 3 %

DP

Less than 3°

K-factor (2T pulse)

Less than 3 %

Y/C delay

Less than 20 nsec

Longitudinal (Audio channel 1, 2)

With a metal particle tape

Frequency response

50 Hz to 15 kHz +1.5/-3.0 dB

S/N More than 72 dB (3 % distortion)

Distortion (T.H.D)

Less than 1.5 % (1 kHz reference level)

Cross talk

Less than -55 dB (1 kHz reference level)

Wow and flutter

Less than 0.15 % rms

With an oxide tape

Frequency response

50 Hz to 15 kHz \pm 3.0 dB

S/N(NR OFF)

More than 50 dB (3 % distortion)

(with DOLBY NR off)

Distortion (T.H.D)

Less than 2.0 % (1 kHz reference level)

Crosstalk

Less than -55 dB (1 kHz reference level)

Wow and flutter

Less than 0.15 % rms

AFM (Audio channel 1,2 recorded metal tape)

Frequency response

20 Hz to 20 kHz +0.5/-2.0 dB

Dynamic range

More than 80 dB (1 kHz reference level)

Distortion (T.H.D)

Less than 0.5 % (1 kHz reference level)

Crosstalk

Less than -65 dB (1 kHz reference level)

(5) Microphone

Gun-directional, for the phantom power supplied system

1-1. SPECIFICATIONS (for PAL model)

(with standard playback machine)

(1) General

Power requirements

DC12V (11V to 17V)

Battery pack NP-1B (Ni-Cd, 2.3Ah)

or NP-1A (Ni-Cd, 1.7Ah)

For AC operation: use optional AC-550CE

AC adaptor

Power consumption

25 W

(using a metal particle tape, 12V)

Operating temperature

0°C to +40°C

Operating humidity

Less than 85% (relative humidity)

Storage temperature

-20°C to +60°C

Mass Approx. 5.0 kg

Battery pack

NP-1B, NP-1A : 0.7 kg

BP-90A, BP-90 : 1.7 kg

Dimensions

132 × 208 × 370 mm (w/h/d)

(Not incl. projecting parts and controls)

Video cassette

1/2 inch, cassette tape for Betacam format

Metal particle tape

BCT-5M/10M/20M/30M or equivalent

Oxide tape

BCT-5G/10G/20G/30G or equivalent

Tape speed

Approx. 101.5 mm/sec

Recording playback time

More than 36 minutes (with BCT-30M)

F.FWD time

Less than 9 minutes (with BCT-30M)

REW time

Less than 5 minutes (with BCT-30M)

Continuous Operating time

Approx. 60 minutes (with NP-1B)

(2) CONNECTOR**AUDIO IN**

CH-1/CH-2 (REAR) XLR-3 pin (female)

GENLOCK IN BNC

TC IN BNC

TC OUT BNC

VIDEO OUT BNC

TEST OUT BNC

EARPHONE OUT Mini jack

PB ADAPTOR 20 pin

LENS 12 pin

REMOTE 6 pin

VF 20 pin

DC IN XLR-4 pin

DC OUT 12V 4 pin

MIC IN (FRONT) XLR-3 pin (female)

(3) CAMERA**CAMERA**

Imager 2/3-inch frame interline-transfer, Hyper HAD CCD

Imager configuration

RGB 3-CCDs

Spectral system

F1.4 prism system (with quartz filter)

Built-in filters

CC filter

A: Cross filter

B: 3200 K

C: 4300 K

D: 6300 K

ND filter

1: Straight through

2: 1/4 ND

3: 1/16 ND

4: 1/64 ND

Electronic shutter speed

- 1/60, 1/125, 1/250, 1/500, 1/1000, 1/2000 second
- 310 speeds from 50.2 to 9000 Hz (in CLS mode)
- 295 speeds from 25.4 to 48.7 Hz (in ECS mode)
- 1/50 second (in EVS mode)

Lens mount

Special bayonet type

Video output

1.0 Vp-p, 75 ohms, unbalanced, sync negative, two outputs

Sensitivity

2000 lux with F8 (typical),
89.9 % reflection chart

Minimum subject illumination

1.9 lux (at F1.4, +30 dB gain)

Video signal-to-noise ratio

60 dB (Y typical)

Horizontal resolution

850 or more TV lines (at center)

Registration

0.05 % or better for entire screen area
(excluding distortion due to lens)

Geometric distortion

Not identified (excluding distortion due to lens)

Smear

-120 dB (Y typical)

VIEWFINDER

Picture tube

1 1/2 inch monochrome, quick start type
with BRIGHT control, CONTRAST control,
PEAKING control, TALLY switch,
ZEBRA switch, AUDIO IND switch,
AUDIO LEVEL CH-1 control (covered by the
guard cap)

Resolution

600 TV lines (at center)

(4) VTR

Video system

With a metal particle tape

Bandwidth

Luminance (50 %) :

25 Hz to 5.5 MHz + 0.5/-3.0 dB

Chrominance :

30 Hz to 1.5 MHz + 0.5/-3.0 dB

S/N

Luminance* :

More than 48 dB

Color difference :

More than 48 dB

Low frequency non-Linearity

Less than 3 %

Pulse shape distortion (K-pulse 2T)

Less than 2 %

Y/C delay

Less than 20 nsec

With an oxide tape

Bandwidth

Luminance :

25 Hz to 4.0 MHz + 0.5/-6.0 dB

Chrominance :

30 Hz to 1.5 MHz + 0.5/-3.0 dB

S/N

Luminance* :

More than 46 dB

Color difference :

More than 45 dB

Low frequency non-Linearity

Less than 4 %

Pulse shape distortion (K-pulse 2T)

Less than 3 %

Y/C delay

Less than 20 nsec

* The input/output levels of the component signals conform to the EBU "N-10" standard.

Audio system

Longitudinal (Audio channel 1, 2)

With a metal particle tape

Frequency response (20 dB below peak level)**

50 Hz to 15 kHz + 1.5/-3.0 dB

S/N*² More than 62 dB

Distortion (at 1 kHz)

at peak level*¹ Less than 3 %

at 0VU level Less than 1.5 %

Cross talk (at 1 kHz)

Less than -55 dB

Wow and flutter (DIN 45507)

Less than 0.15 %

Depth of erasure (at 1 kHz)

More than 65 dB

With an oxide tape

Frequency response (20 dB below peak level)**

50 Hz to 15 kHz \pm 3.0 dB

S/N*² More than 58 dB (with DOLBY NR on)

Distortion (at 1 kHz)

at peak level*¹ Less than 3 %

at 0VU level Less than 2 %

Cross talk (at 1 kHz)

Less than -55 dB

Wow and flutter (DIN 45507)

Less than 0.15 %

Depth of erasure (at 1 kHz)

More than 65 dB

AFM (Audio channel 1,2 recorded metal tape)

Frequency response (20 dB below peak level)**

20 Hz to 20 kHz + 0.5/-2.0 dB

S/N*² More than 68 dB

Distortion (at 1 kHz)

at peak level*¹ Less than 3 %

at 0VU level Less than 0.6 %

Cross talk (at 1 kHz)

Less than -65 dB

*¹) Peak level AFM: +19 VU, LNG: +8 VU

*²) Referred to peak level, weighted CCIR468-3, with Audio N.R.

(5) Microphone

Gun-directional, for the phantom power supplied system

1-2. INPUT/OUTPUT SIGNALS OF THE CONNECTORS**INPUT**

AUDIO IN (REAR) BVW-D600: -60 dBu /
+ 4 dBu (selectable)
BVW-D600P: -60 dBs /
+ 4 dBs (selectable)
high impedance, balanced
GENLOCK IN 1.0 Vp-p, 75 ohms
TC IN 0.5 to 18 Vp-p, 10 kohms
DC IN 11 to 17 V

MIC IN (FRONT)

BVW-D600: -60 dBu
(0 dBu = 0.775 Vrms)
BVW-D600P: -60 dBs
(0 dBs = 0.775 Vrms)

OUTPUT

VIDEO OUT 1.0 Vp-p, 75 ohms unbalanced
TEST OUT 1.0 Vp-p, 75 ohms unbalanced
TC OUT 1.0 Vp-p, 75 ohms
DC OUT 11 to 17 V

VF CONNECTOR (20P)

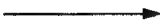























No.	SIGNAL	SPECIFICATION
1	VTR SAVE	SAVE: 0 V, STBY: +9.3 V
2	① ON/OFF	ON: 0 V, OFF: +9.3 V
3	V SIZE	WIDE: 0 V, NORMAL: +9.3 V or OPEN
4	REC ALARM (DOWN)	ON: +9 V, OFF: 0 V or OPEN
5	MARKER ON/OFF	ON: 0V, OFF: +4.6 V
6	CCIR/EIA	CCIR: +8.5 V, EIA: 0 V, $Z_o = 1\text{ k}\Omega$
7	AUDIO IND ON/OFF	ON: +4.6 V or OPEN, OFF: 0 V, $Z_o = 1.5\text{ k}\Omega$
8	G TALLY	ON: +4.5 V, OFF: 0 V, or OPEN
9	NC	_____
10	VF VIDEO (G)	GND for VF VIDEO
11	ZEBRA ON/OFF	ON: 0 V, OFF: OPEN or +9.3 V
12	VF VIDEO (X)	$Z_o \geq 100\Omega$ 1 Vp-p
13	AU LEVEL CONT	0 V (0 dB) to +7 V (-20 dB)
14	NC	_____
15	NC	_____
16	H:BATT IND	ON: +5 V, OFF: 0 V or OPEN
17	REC/ALARM (UP)	ON: +9 V, OFF: 0 V or OPEN
18	+9.3 V (VF)	+9.3 V
19	UNREG GND	GND
20	UNREG +12V	+11 V to +17 V

REMOTE CONNECTOR (6P)



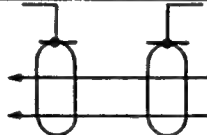
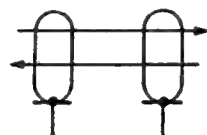








No.	SIGNAL	SPECIFICATION
1	CAMERA SD	Serial data for RM
2	CAMERA SD	
3	UNREG GND	GND
4	TEST (X)	1 Vp-p, $Z_o = 75\ \Omega$
5	TEST (G)	
6	UNREG +12 V	+11 V to +17 V

CCZ CONNECTOR (26P)


Fit the VTR connector unit BKW-402 which is separately available in the market to the main unit and connect with BVW-50/50P, VA-5/5P and BVV-5/5PS by CCZ cable.

No.	SIGNAL	BVW-D600/D600P	DIRECTION	EXT VTR SIDE
1	VBS (X)	Zo = 75Ω 1Vp-p±1dB DC = 0±100mV		Zi = 75Ω
2	VBS (G)			
3	Y VIDEO (G)	Zo = 75Ω 1Vp-p±0.5dB DC = 0±200mV		Zi = 75Ω
4	Y VIDEO (X)			
5	R-Y VIDEO (X)	Zo = 75Ω 700mVp-p (NTSC) 525mVp-p (PAL) EBU N-10 LEVEL (75% color bars)		Zi = 75Ω
6	R-Y VIDEO (G)			
7	B-Y VIDEO (X)	Zo = 75Ω 700mVp-p (NTSC) 525mVp-p (PAL) EBU N-10 LEVEL (75% color bars)		Zi = 75Ω
8	B-Y VIDEO (G)			
9	AUDIO CH1 (X)	-60dBm Zo ≤ 600Ω (BALANCED)		Zi = 3kΩ ~ 10kΩ (BALANCED)
10	AUDIO CH1 (Y)			
11	AUDIO CH1 (Z)			
12	VTR START/STOP	START : 4.5 ± 0.5Vdc STOP : 0 ± 0.5Vdc Zo ≤ 10kΩ		START: 5 ± 0.3 V STOP: 0 ± 0.3 V or OPEN
13	NC			
14	NC			
15	REC ALARM	Zi ≥ 20kΩ		
16	NC			
17	SHIELD			GND
18	RET VIDEO (X)	Zi = 75Ω		Zo = 75Ω 1Vp-p ± 1dB DC = 0±200mV
19	RET VIDEO (G)			
20	VTR SAVE	SAVE : 4.5 ± 0.5V STBY: 9 ± 0.5 V Zo ≤ 10kΩ		
21	NC			
22	COLOR FRAMING	5 ± 1V		Zi ≥ 100kΩ
23	NC			
24	NC			
A	POWER SENSE			min. 11V Max. 17V
B	UNREG GND			

PB ADAPTOR CONNECTOR (20P)



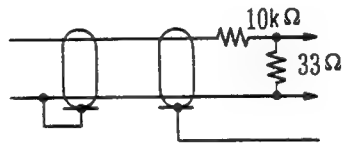



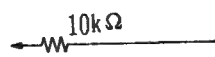
No.	SIGNAL	VTR	DIRECTION	PB ADAPTOR
1	Y-RF (X)	75 Ω (OXIDE=0.1 Vp-p) METAL=0.2 Vp-p (Center Carrier)		Z = 75 Ω
2	Y-RF (G)			
20	C-RF (X)	75 Ω (OXIDE=0.1 Vp-p) METAL=0.2 Vp-p (Center Carrier)		Z = 75 Ω
19	C-RF (G)			
3	AUDIO CH1 (X)	LOW Impedance -10 dBu		Z = 10 k Ω
5	AUDIO CH2 (X)			
4	AUDIO (G)			
16	Y SW PULSE (X)	1,3 CH : H 2,4 CH : L OPEN COLLECTOR		Z = 10 k Ω , Pull up +5 V
18	ADVANCE SYNC (X)	Z = 75 Ω		2 \pm 0.5 Vp-p, 75 Ω
15	ADVANCE SYNC (G)			
6	CONTROL SIG. 1	METAL "H" FF/REW "M" OXIDE "L" H = 5.0 V M = 2.5 V L = 0 V		High impedance
17	CONTROL SIG. 2	PLAY : HIGH (> 6.5 V) Z = 10 k Ω		Z = 57 k Ω
9	VIDEO (X)			Z = 75 Ω 1 Vp-p
10	VIDEO (G)			
7	GND			
8	GND			
13	+12 V			
14	+12 V			
12	C SW PULSE (X)	1,3 CH : L 2,4 CH : H (0.3V)		Z = 75 Ω
11	C SW PULSE (G)	EMITTER FOLLOWER (OPEN)		

LENS CONNECTOR (12P)

No.	SIGNAL	SPECIFICATION
1	L:PB CONT	ENABLE: 0 V, DISABLE: +5 V or OPEN
2	L:VTR START/STOP	TRIG: 0 V  5 Vp-p
3	UNREG GND	GND
4	AUTO +5 V	AUTO: +5 V, MANU:0 V or OPEN
5	IRIS CONT	+3.4 V (F16) to +6.2 V (F2.8)
6	UNREG +12 V	+11 V to +17 V
7	IRIS POS.	+3.4 V (F16) to +6.2 V (F2.8)
8	REMOTE/LOCAL	REMOTE MODE: +4.6 V, LOCAL MODE: 0 V
9	EXTENDER ON/OFF	ON:0 V, OFF: +4.6 V or OPEN
10	ZOOM POS.	WIDE: +2 V, TELE: +7 V
11	NC	_____
12	NC	_____

PB ADAPTOR CONNECTOR (20P)

- When the unit is connected with the BVW-50/50P by the optional connection cable CCRZ-5.

No.	SIGNAL	SPECIFICATION	DIRECTION	BVW-50/50P 26 PIN No.
1	W50 REC / ALARM	0V, +2.5V, +5Vdc		15
20	W50 START / STOP	START: 4.5 Vdc STOP: 0Vdc		12
3	AUDIO CH1 (X)	Output -10dBu		9 10 11
4	AUDIO CH1 (G)			
18	RETURN VIDEO (X)	1.0Vp-p, 75Ω		18
15	RETURN VIDEO (G)			19
9	VIDEO (X)	1.0Vp-p, 75Ω		1
10	VIDEO (G)			2
7	GND			B
8	GND			
12	INTERFACE SENCE	UNREG +12V IN		A

1-3. CONNECTION CONNECTOR

When external cables are connected to the various connectors on the connector panel during maintenance, the hardware listed below (or equivalents) must be used.

Panel indication	Connection connector
AUDIO IN	1-508-084-00 CONNECTOR, XLR, 3P, MALE
DC IN	1-508-362-00 PLUG, XLR, 4P, FEMALE
TC IN/OUT GENLOCK IN VIDEO OUT TEST OUT	1-560-069-11 PLUG, BNC, MALE
PB ADAPTOR	1-566-771-11 PLUG, 20P MALE
MIC IN	1-508-084-00 CONNECTOR, XLR, 3P MALE
REMOTE	1-560-078-00 CONNECTOR, 6P, MALE
DC OUT	1-565-654-11 CONNECTOR, ROUND TYPE 4P
EXT VTR (OPTION: BKW-402)	1-564-184-21 PLUG, CONNECTOR (SOCKET) 26P, FEMALE

1-4. SETTING OF THE SYSTEM SELECT CIRCUIT

Along with the select switches and controls on the side panel, some internal system select circuits are on the circuit boards.

• TC-48B/48BP Board

- (1) SL7
Set the condition to TC generator is put into the power save mode.
When the battery is disconnected, TC generator is put into the power save mode: SL7 is opened.
When the POWER switch is turned OFF, TC generator is put into the power save mode: SL7 is shorted.
When the unit is shipped, SL7 is opened.
- (2) SL8
Selects whether the color frame flag should be set or not, when the color frame flag is locked.
Set the color frame flag : SL8 is opened.
Does not set the color frame flag : SL8 is shorted.
When the unit is shipped, SL8 is opened.
- (3) SL10, SL11
Selects the power supply while TC is power save mode.
UNSW +12V : SL10 is shorted, SL11 is opened,
(TC generator : ON)
UNREG +12V : SL10 is opened, SL11 is shorted.
(TC generator : OFF)
When the unit is shipped, SL10 is shorted.
- (4) S517 SLAVE U-BIT INT/EXT SW
Selects whether the U-bit is slaved by internal or external, when locking the slave.
When the unit is shipped, this switch is set to the INT position.
- (5) S518 REAL TIME VITC/LTC SW
Selects whether the real time is recorded on the VITC or the LTC.
When the unit is shipped, this switch is set to the VITC position.
- (6) S103, S203 LIMITER ON/OFF SW
When turned OFF, audio level limiter is released.
S103: CH-1
S203: CH-2
When the unit is shipped, these switches are set to the ON position.

• **SY-117C/117CP Board**

- (1) S1 SLACK MUTE SW
When turned ON, detection of the slack is muted. Normally set to the OFF position.
When the unit is shipped, this switch is set to the OFF position.

• **AT-75 Board**

- (1) S1 ENG/USER SW
Selects the Setup Menu mode.
ENG: ENG (engineer) mode
USER: USER mode
When the unit is shipped, this switch is set to the USER position. When changing the mode, with the power of the unit off, change over this switch and turn the power on again.
- (2) S3 BACKUP SW
Set to ON to keep data such as auto white / black balance as backup data. When turned off, the backup data will be deleted. Normally set to the OFF position.

Note: Switches S2-1 to S2-4 are not used normally. Always set to the OFF position.

• **IF-393/393P Board**

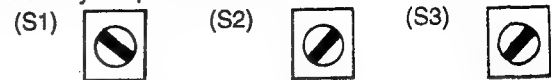
- (1) S1 MENU SW
Selects whether a character signal for setup menu is superimposed on the output signal at TEST OUT connector or not. Set to ON to superimpose the character signal. When the unit is shipped, this switch is set to the OFF position.

Note: Switches S2-1 to S2-4 are not used normally. Always set to the OFF position.

• **AD-83 Board**

Note: Switches S1 to S3 are not used normally. Always set to the factory-set position as shown below.

Factory-set position



• **MB-440/440P Board**

- (1) (SL1)
When SL1 is shorted, the VTR SAVE indicator of VF is lit during recording.
When the unit is shipped, SL1 is shorted.
- (2) (SL2)
Selects whether TC is output or not during playback.
When SL2 is shorted, TC is output.
When the unit is shipped, SL2 is shorted.

• **VR-177 Board (Viewfinder)**

- (1) (SL1)
When SL1 is shorted, the TALLY indicator on the cabinet of VF is lit during recording.
When the unit is shipped, SL1 is shorted.
- (2) (SL2)
When SL2 is shorted, the REC indicator in the VF is lit during recording.
When the unit is shipped, SL2 is shorted.
- (3) (SL6)
When SL6 is shorted, the spare indicator in the VF is lit.
When the unit is shipped, SL6 is shorted.

Note: SL3, SL4 and SL5 are optional.
When the unit is shipped, they are set as follows.
SL3, SL4, SL5 : Opened

1-5. SETUP MENU

The setup menu can be used to control system circuit, besides to select settings and to select which items are displayed on the VF screen. A menu of camera adjustments is also provided.

[Basic operation]

1. Set the MENU ON/OFF/PAGE switch to ON. The display of current settings disappears and the menu page that was on screen when the last menu access ended appears.
2. To page through the menu, push the MENU ON/OFF/PAGE switch to PAGE. Every time you push this switch, the next page of the menu is displayed.
3. To select an item, push the MENU CANCEL/PRST/ITEM switch to ITEM. Every time you push this switch, the cursor pointing the selected item moves to the next items.
4. You can change the setting of the selected item or ON/OFF selection using the UP/ DOWN buttons.
5. To close the menu, return the MENU ON/OFF/PAGE switch to OFF.

[Changing the mode]

The setup menu consists of the ENG (engineer) menu and USER menu.

At shipping, the unit is in the USER menu mode. When using the ENG menu mode, with the power of the unit off, set the ENG/USER switch on the AT-75 board to ENG and then turn the power on again.

[Factory-setting menu page]

At shipping, the unit is in the USER mode and the pages marked with * in the table are available.

[Firmware Upgrade]

The contents of setup menu are subject to change according to the firmware version of IC33 EPROM on the AT-75 board.

Version 1.02 See pages 1-13(a) to 1-16(a).

Version 1.07 See pages 1-13(b) to 1-16(b).

Note 1:

When the unit is connected to a remote control unit RM-P9 and is being controlled remotely, the following settings cannot be changed with the setup menu.

- SHUTTER SPEED *1
- SETUP CARD *2
- FUNCTION 1/2
 - DETAIL ON/OFF
 - MATRIX ON/OFF
 - GAMMA ON/OFF
 - CHROMA ON/OFF
 - TEST SAW ON/OFF *1
- FUNCTION 2/2
 - FILTER INH. ON/OFF
 - A. IRIS OVERRIDE ON/OFF
- LEVEL 1/9
 - DETAIL LEVEL *1
- LEVEL 3/9
 - MASTER BLACK *1
 - MASTER GAMMA *1
 - KNEE ON/OFF
 - KNEE POINT *1
 - KNEE SLOPE
- LEVEL 5/9
- LEVEL 9/9
 - IRIS SET *1
- AUTO SHADING
- DCC ADJUSTMENT
- MEASUREMENT MODE
- DATA RESET

*1: These items are adjusted with switches or controls of the RM-P9.

*2: IC33 EPROM/AT-75 board: Version 1.02 only

Note 2:

The following setting data is neither read from the setup card nor written to the setup card.

- DIA GAIN
- DCC ADJUSTMENT
- OPERATION MODE
- SG ADJUSTMENT

Configuration of Setup Menu

PAGE NAME	PAGE AVAILABLE		ITEM () in parentheses; Factory setting, (*) shows turning on	FUNCTION/REFERENCE
	USER	ENG		
* MARKER 1/2	Yes	Yes	SAFETY ZONE [ON/OFF] (ON) SAFETY AREA [80%/90%] (90%) CENTER [ON/OFF] (ON) CENTER H CENTER V	Sets markers cf. Operation manual
MARKER 2/2	Yes	Yes	BOX CURSOR [ON/OFF] (OFF) BOX WIDTH BOX HEIGHT BOX H BOX V	Sets BOX cursor cf. Section 1-5-1.
* VF DISPLAY	Yes	Yes	DISP MODE (3) EXTENDER (ON) ZOOM (ON) FILTER (ON) WHITE (ON) GAIN (ON) SHUTTER (ON) TAPE (ON) IRIS (ON) CAMERA ID (ON)	Selects the display shown on the VF screen cf. Operation manual
* MASTER GAIN	Yes	Yes	LOW (0dB) MID (9dB) HIGH (18dB)	Sets the gain switch value cf. Operation manual
* CAMERA ID	Yes	Yes	ID: □□□□□□□□□□	Set the camera ID indication cf. Operation manual
SHUTTERSPEED	Yes	Yes	CLS (*) EVS (*) 1/100 (NTSC) 1/60 (PAL) (*) 1/125 (*) 1/250 (*) 1/500 (*) 1/1000 (*) 1/2000 (*)	Sets the shutter speed/mode cf. Operation manual.
* CLEAR SCAN	Yes	Yes	□□.□ Hz (60.1 Hz: NTSC) (50.2 Hz: PAL)	Sets the CLS shutter speed cf. Operation manual
I LED	Yes	Yes	GAIN (*) SHUTTER (*) WHITE PRESET EXTENDER (*) FILTER A. IRIS OVERRIDE	Set the Operation of the ① indicator cf. Operation manual.
* SETUP CARD	Yes	Yes	READ WRITE WRITE PROTECT (OFF) ID EDIT	Accesses the setup card cf. Operation manual
FUNCTION 1/2	Yes	Yes	DETAIL [ON/OFF] (ON) CROSS COLOR FLT [ON/OFF] (OFF) SKIN TONE DTL [ON/OFF] (OFF) MATRIX [ON/OFF] (OFF: NTSC, ON: PAL) GAMMA [ON/OFF] (ON) CHROMA [ON/OFF] (ON) TEST SAW [ON/OFF] (OFF)	Turns on/ off the system circuits cf. Section 1-5-2.

BVW-D600(UC)
BVW-D600P (UC, EK)

PAGE NAME	PAGE AVAILABLE		ITEM () in parentheses; Factory setting, (*) shows turning on	FUNCTION/REFERENCE
	USER	ENG		
LEVEL 6/9	Yes	Yes	WHT R-H SAW WHT R-V SAW WHT G-H SAW WHT G-V SAW WHT B-H SAW WHT B-V SAW	cf. Section 7-8-4. Manual White Shading Adjustment
LEVEL 7/9	Yes	Yes	BLK R-H SAW BLK R-V SAW BLK G-H SAW BLK G-V SAW BLK B-H SAW BLK B-V SAW	cf. Section 7-8-3. Manual Black Shading Adjustment
LEVEL 8/9	Yes	Yes	MATRIX TABLE [A/B] (A) MATRIX R-G (0) MATRIX R-B (0) MATRIX G-R (0) MATRIX G-B (0) MATRIX B-R (0) MATRIX B-G (0)	cf. Section 1-5-2. cf. Section 1-5-7.
LEVEL 9/9	Yes	Yes	H PHASE SC PHASE FINE SC-H COARSE IRIS SET IRIS MODE	cf. Section 1-5-5. cf. Section 7-2-4. INC SC PHASE Adjustment cf. Section 7-15. Auto Iris Adjustment
D/A GAIN	No	Yes	ENC GAIN TEST RGB GAIN VTR Y GAIN VTR R-Y GAIN VTR B-Y GAIN VTR Y SETUP (NTSC only)	cf. Section 7-2-1. EN Gain Adjustment cf. Section 7-4. TEST OUT Adjustment cf. Section 7-5-1. VTR Y Adjustment cf. Section 7-5-2. VTR R-Y/B-Y Adjustment cf. Section 7-5-1. VTR Y Adjustment
MENU SELECT 1/3	No	Yes	MARKER 1/2 (*) MARKER 2/2 (*) VF DISPLAY (*) MASTER GAIN (*) CAMERA ID (*) SHUTTER (*) CLEAR SCAN (*) ! LED (*) SETUP CARD (*)	cf. Section 1-5-3.
MENU SELECT 2/3	No	Yes	FUNCTION 1/2 FUNCTION 2/2 TEST OUT (*)	cf. Section 1-5-3.
MENU SELECT 3/3	No	Yes	LEVEL 1/9 LEVEL 2/9 LEVEL 3/9 LEVEL 4/9 LEVEL 5/9 LEVEL 6/9 LEVEL 7/9 LEVEL 8/9 LEVEL 9/9	cf. Section 1-5-3.

MENU VER. 1.02

PAGE NAME	PAGE AVAILABLE		ITEM () in parentheses; Factory setting, (*) shows turning on	FUNCTION/REFERENCE
	USER	ENG		
AUTO SHADING	No	Yes	BLACK WHITE	cf. Section 7-8-1. Black Shading Adjustment cf. Section 7-8-2. White Shading Adjustment
DCC ADJUSTMENT	No	Yes	D RANGE POINT GAIN	} cf. Section 7-12-2. DCC Knee Adjustment
OPERATION MODE	No	Yes	R-G/B-G SEL. [ON/OFF] (OFF) ZEBRA [ON/OFF] (OFF) GAMMA TABLE [A/B] (A)	
SG ADJUSTMENT	No	Yes	H BLKG WIDTH V BLKG [19/20/21H] (NTSC only) (20H)	cf. Section 1-5-6.
MEASUREMENT MODE	No	Yes	S/N MODULATION RESOLUTION SENSITIVITY REGISTRATION	cf. Section 1-5-9.
DATA RESET	No	Yes	USER ENGINEER	cf. Section 1-5-4.

Configuration of Setup Menu

PAGE NAME	PAGE AVAILABLE		ITEM () in parentheses; Factory setting, (*) shows turning on	FUNCTION/REFERENCE
	USER	ENG		
* MARKER 1/2	Yes	Yes	SAFETY ZONE [ON/OFF] (ON) SAFETY AREA [80%/90%] (90%) CENTER [ON/OFF] (ON) CENTER H CENTER V	Sets markers cf. Operation manual
MARKER 2/2	Yes	Yes	BOX CURSOR [ON/OFF] (OFF) BOX WIDTH BOX HEIGHT BOX H BOX V	Sets BOX cursor cf. Section 1-5-1.
* VF DISPLAY	Yes	Yes	DISP MODE (3) EXTENDER (ON) ZOOM (ON) FILTER (ON) WHITE (ON) GAIN (ON) SHUTTER (ON) TAPE (ON) IRIS (ON) CAMERA ID (ON)	Selects the display shown on the VF screen cf. Operation manual
* MASTER GAIN	Yes	Yes	LOW (0dB) MID (9dB) HIGH (18dB)	Sets the gain switch value cf. Operation manual
* CAMERA ID	Yes	Yes	ID: □□□□□□□□□□	Set the camera ID indication cf. Operation manual
SHUTTER SPEED	Yes	Yes	CLS (*) EVS (*) 1/100 (NTSC) 1/60 (PAL) (*) 1/125 (*) 1/250 (*) 1/500 (*) 1/1000 (*) 1/2000 (*)	Sets the shutter speed/mode cf. Operation manual.
* CLEAR SCAN	Yes	Yes	□□.□ Hz (60.1 Hz: NTSC) (50.2 Hz: PAL)	Sets the CLS shutter speed cf. Operation manual
LED	Yes	Yes	GAIN (*) SHUTTER (*) WHITE PRESET EXTENDER (*) FILTER A. IRIS OVERRIDE	Set the Operation of the ⊕ indicator cf. Operation manual.
* SETUP CARD	Yes	Yes	READ WRITE WRITE PROTECT (OFF) ID EDIT	Accesses the setup card cf. Operation manual
FUNCTION 1/2	Yes	Yes	DETAIL [ON/OFF] (ON) SKIN TONE DTL [ON/OFF] (OFF) APERTURE [ON/OFF] (ON) MATRIX [ON/OFF] (OFF: NTSC, ON: PAL) GAMMA [ON/OFF] (ON) CHROMA [ON/OFF] (ON) TEST SAW [ON/OFF] (OFF) CROSS COLOR FLT [ON/OFF] (OFF) (NTSC only)	Turns on/ off the system circuits cf. Section 1-5-2.

MENU VER. 1.07

PAGE NAME	PAGE AVAILABLE		ITEM () in parentheses; Factory setting, (*) shows turning on	FUNCTION/REFERENCE
	USER	ENG		
FUNCTION 2/2	Yes	Yes	GENLOCK [ON/OFF] (ON) CAM RET[ON/OFF] (OFF) FILTER INH. [ON/OFF] (OFF) FIELD/FRAME (FLD) VTR MODE [PAR/EXT] (PAR) EXT VTR IND. [ON/OFF] (OFF) 26P IF [ON/OFF] (OFF) A. IRIS OVERRIDE [ON/OFF] (OFF)	Turns on/ off the system circuits cf. Section 1-5-2.
* TEST OUT	Yes	Yes	ENC (*) R G B	Sets the test signal output cf. Operation manual
LEVEL 1/9	Yes	Yes	DETAIL LEVEL V DTL LEVEL H DTL FREQ. V DTL BLK CLIP DTL WHT CLIP DTL BLK CLIP CRISPENING LEVEL DEPEND KNEE APERTURE APERTURE LEVEL	} cf. Section 7-13. Detail Signal Adjustment } Adjusts the aperture.
LEVEL 2/9	Yes	Yes	SKIN TONE HUE (119) SKIN TONE DTL SAT. CENTER (S) HUE CENTER (H) SAT. RANGE (dS) HUE RANGE (dH) SKIN TONE IND. [ON/OFF] (OFF)	} cf. Section 1-5-8. } cf. Section 1-5-2.
LEVEL 3/9	Yes	Yes	MASTER BLACK MASTER GAMMA KNEE [ON/OFF] (ON) KNEE POINT KNEE SLOPE WHITE CLIP [ON/OFF] (ON) WHT CLIP LEVEL ZEBRA1 DETECT ZEBRA2 [ON/OFF] (OFF) ZEBRA2 DETECT	} cf. Section 7-10. Black Set Adjustment Adjusts the master gamma cf. Section 1-5-2. } cf. Section 7-12-1. Manual knee. White Clip Adjustment. } cf. Section 7-12-1 Manual knee White Clip Adjustment } cf. Section 7-14. Zebra Adjustment cf. Section 1-5-2. } cf. Section 7-14. Zebra Adjustment
LEVEL 4/9	Yes	Yes	I(NTSC)/R-Y(PAL) BURST LEVEL Q(NTSC)/B-Y(PAL) BURST LEVEL I(NTSC)/R-Y(PAL) CHROMA LEVEL Q(NTSC)/B-Y(PAL) CHROMA LEVEL I(NTSC)/R-Y(PAL) [ON/OFF] (ON) Q(NTSC)/B-Y(PAL) [ON/OFF] (ON) ENC Y LEVEL ENC SETUP LEVEL (NTSC only) Q B.W. [WIDE/NRW.] (NTSC only) (WIDE)	} cf. Section 7-2-3 CHROMA Adjustment } cf. Section 1-5-2. } cf. Section 7-2-2. ENY LEVEL Adjustment cf. Section 1-5-2.
LEVEL 5/9	Yes	Yes	R BLACK G BLACK B BLACK R FLARE G FLARE B FLARE R GAMMA G GAMMA B GAMMA	} Adjusts R/G/B black level. } cf. Section 7-11. Flare Adjustment } cf. Section 7-9. Gamma Correction Adjustment

PAGE NAME	PAGE AVAILABLE		ITEM () in parentheses; Factory setting, (*) shows turning on	FUNCTION/REFERENCE
	USER	ENG		
LEVEL 6/9	Yes	Yes	WHT R-H SAW WHT R-V SAW WHT G-H SAW WHT G-V SAW WHT B-H SAW WHT B-V SAW	cf. Section 7-8-4. Manual White Shading Adjustment
LEVEL 7/9	Yes	Yes	BLK R-H SAW BLK R-V SAW BLK G-H SAW BLK G-V SAW BLK B-H SAW BLK B-V SAW	cf. Section 7-8-3. Manual Black Shading Adjustment
LEVEL 8/9	Yes	Yes	MATRIX TABLE [A/B] (A) MATRIX R-G (0) MATRIX R-B (0) MATRIX G-R (0) MATRIX G-B (0) MATRIX B-R (0) MATRIX B-G (0)	cf. Section 1-5-2. cf. Section 1-5-7.
LEVEL 9/9	Yes	Yes	H PHASE SC PHASE FINE COARSE SC-H IRIS SET IRIS MODE	cf. Section 1-5-5. cf. Section 7-2-4. INC SC PHASE Adjustment cf. Section 7-15. Auto Iris Adjustment
D/A GAIN	No	Yes	ENC GAIN TEST RGB GAIN VTR Y GAIN VTR R-Y GAIN VTR B-Y GAIN VTR Y SETUP (NTSC only)	cf. Section 7-2-1. EN Gain Adjustment cf. Section 7-4. TEST OUT Adjustment cf. Section 7-5-1. VTR Y Adjustment cf. Section 7-5-2. VTR R-Y/B-Y Adjustment cf. Section 7-5-1. VTR Y Adjustment
MENU SELECT 1/3	No	Yes	MARKER 1/2 (*) MARKER 2/2 (*) VF DISPLAY (*) MASTER GAIN (*) CAMERA ID (*) SHUTTER (*) CLEAR SCAN (*) ! LED (*) SETUP CARD (*)	cf. Section 1-5-3.
MENU SELECT 2/3	No	Yes	FUNCTION 1/2 FUNCTION 2/2 TEST OUT (*)	cf. Section 1-5-3.
MENU SELECT 3/3	No	Yes	LEVEL 1/9 LEVEL 2/9 LEVEL 3/9 LEVEL 4/9 LEVEL 5/9 LEVEL 6/9 LEVEL 7/9 LEVEL 8/9 LEVEL 9/9	cf. Section 1-5-3.

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PAGE NAME	PAGE AVAILABLE		ITEM () in parentheses; Factory setting, (*) shows turning on	FUNCTION/REFERENCE
	USER	ENG		
AUTO SHADING	No	Yes	BLACK WHITE	cf. Section 7-8-1. Black Shading Adjustment cf. Section 7-8-2. White Shading Adjustment
DCC ADJUSTMENT	No	Yes	D RANGE POINT GAIN	} cf. Section 7-12-2. DCC Knee Adjustment
OPERATION MODE	No	Yes	R-G/B-G SEL. [ON/OFF] (OFF) ZEBRA [ON/OFF] (OFF) GAMMA TABLE [A/B/C] (A)	
SG ADJUSTMENT	No	Yes	H BLKG WIDTH V BLKG [19/20/21H] (NTSC only) (20H)	cf. Section 1-5-6.
MEASUREMENT MODE	No	Yes	S/N MODULATION RESOLUTION SENSITIVITY REGISTRATION	cf. Section 1-5-9.
DATA RESET	No	Yes	USER ENGINEER	cf. Section 1-5-4.

1-5-1. Setting the Box Cursor

You can determine whether or not to display the box cursor on the VF screen and change a box cursor size using the MARKER 2/2 page of the setup menu.

- BOX CURSOR ON/ OFF (Factory-setting: OFF)
Push the UP button and set the box cursor to ON. The box cursor will be displayed on the VF screen.
- BOX WIDTH
- BOX HEIGHT
- BOX H POSITION
- BOX V POSITION
When the BOX CURSOR selection is set to ON, the size or display position of the box cursor can be changed using the UP/DOWN buttons.

1-5-2. Turning on/off the System Circuit

You can turn on or off a system circuit using several pages of the setup menu.

[FUNCTION 1/2 page]

- DETAIL ON/OFF (Factory-setting: ON)
When set to ON, the detail signal for resolution improvement is added to the video signal.
- SKIN TONE DETAIL ON/OFF (Factory-setting: OFF)
When set to ON, the skin tone detail circuit is activated.
- APERTURE ON/OFF (Factory-setting: ON)
Turns on/off the aperture signal for the frequency compensation.
- MATRIX ON/OFF (Factory-setting: OFF for NTSC, ON for PAL)
When set to ON, the linear matrix circuit is activated to obtain the high-saturated color appearance.
- GAMMA ON/OFF (Factory-setting: ON)
When set to ON, the gamma correction is performed so that the total characteristic of signals between camera and monitor is " $\gamma = 1$ ".
- CHROMA ON/OFF (Factory-setting: ON)
Set to OFF to turn off a chroma component of the ENC (or composite) signal.
- TEST SAW ON/OFF (Factory-setting: OFF)
When set to ON, the lens is forcibly closed and the TEST SAW waveform is added to the video signal circuit. Set this item to ON for the Video signal system adjustment.
- CROSS COLOR FILTER ON/OFF (Factory-setting: OFF)
When set to ON, the cross color of video signal is reduced. (NTSC only)

BVW-D600 (UC)
BVW-D600P (UC, EK)

[FUNCTION 2/2 page]

- GENLOCK ON/OFF (Factory-setting: ON)
When set to ON, the video signal is synchronized with the genlock signal that is input to the GENLOCK IN connector.
- CAM RETURN ON/OFF (Factory-setting: OFF)
When set to ON, the return video signal that is input to the GENLOCK IN connector can be displayed on the VF screen.
- FILTER INHIBIT ON/OFF (Factory-setting: OFF)
When set to OFF, the values of the white balance adjusted at each filter position can be stored in the memory A or B independently. That is, up to eight adjustment values ; four for memory A and four for memory B can be stored.
When set to ON, only two values can be stored ; one for A and one for B. In this case, the adjusted values will not correspond to the selection of the color temperature conversion filter. The white balance settings will be stored in the memory A or B, or be read out of the memory with the WHITE BAL selector on the side panel.
- FIELD/FRAME (Factory-setting: FLD)
This menu is used to select the CCD read system. Normally set to "FLD" (field read mode). To improve the vertical resolution, set to "FRM" (frame read mode). In the frame read mode, however, an after image appears compared to the field read mode. In the electronic shutter mode, be sure to set to "FLD".
- VTR MODE PAR/EXT (Factory-setting: PAR)
This setting is valid when an external VTR is connected via a BKW-402 optional VTR connector unit. Set to "PAR" (parallel) to record on both the internal VTR and an external VTR ; set to "EXT" (external only) to record on an external VTR alone.
- EXT VTR INDEPENDENT ON/OFF (Factory-setting: OFF)
The external VTR is normally controlled by the VTR START/STOP button of the unit.
When this item is set to ON, an external VTR can be controlled independently by itself.
- 26P INTERFACE ON/OFF (Factory-setting: OFF)
If an external VTR is connected via a BKW-402 optional VTR connector (26P) unit, the interface circuit is automatically activated and a signal is output at the 26P connector.
If an external VTR is not connected, the interface circuit is not activated and no signal is output. To output signals with no external VTR connected, set this item to ON.

- **AUTO IRIS OVERRIDE ON/OFF** (Factory-setting: OFF)
When set to ON, fine adjustment of the reference value of the auto iris adjustment is enabled within the range of -0.5 to +0.5 by 0.25 stop.

[LEVEL 2/9 page]

- **SKIN TONE INDICATION ON/OFF** (Factory-setting: OFF)
When set to ON, the SKIN TONE detection area can be displayed. For details, refer to Section 1-5-8.

[LEVEL 3/9 page]

- **KNEE ON/OFF** (Factory-setting: ON)
When set to OFF, the knee correction is forcibly cancelled. Set this item to OFF for the video system adjustment.
- **WHITE CLIP ON/OFF** (Factory-setting: ON)
When set to OFF, the white clipping is forcibly cancelled. Set this item to OFF for the video system adjustment.
- **ZEBRA 2 ON/OFF** (Factory-setting: OFF)
Normally a zebra pattern indicates areas of picture where the video levels about 70 IRE units (NTSC) or 490 mV (PAL).
When this item is set to ON, the zebra pattern additionally indicates areas of the pictures where the video level is about 100 IRE units and above (NTSC), or 700 mV and above (PAL).

[LEVEL 4/9 page]

- **I ON/OFF (NTSC)**
- **R-Y ON/OFF (PAL)** (Factory-setting: ON)
When set to ON, the I (NTSC) or R-Y (PAL) signal is added to the encoder circuit. Use for the color difference adjustment of the encoder circuit.
- **Q ON/OFF (NTSC)**
- **B-Y ON/OFF (PAL)** (Factory-setting: ON)
When set to ON, the Q (NTSC) or B-Y (PAL) signal is added to the encoder circuit. Use for the color difference adjustment of the encoder circuit.
- **Q BAND WIDTH WIDE/NARROW (NTSC only)** (Factory-setting: WIDE)
Changes the band width of the Q signal. When changing the setting, perform the chroma adjustment (cf. Section 7-2-3)
WIDE: 1.5 MHz
NARROW: 0.5 MHz

[LEVEL 8/9 page]

- **MATRIX TABLE A/B** (Factory-setting: A)
Selects the matrix circuit. At shipping, the same matrix is assigned for both A and B. To change the matrix coefficient, refer to Section 1-5-7.

[OPERATION MODE page]

- **R-G/B-G SELECT ON/OFF** (Factory-setting: OFF)
When set to ON, the items of R-G and B-G are added to the "TEST OUT" page selecting the test output in addition to ENC, R, G and B.
- **ZEBRA ON/OFF** (Factory-setting: OFF)
When set to ON, a zebra pattern is forcibly made to be appeared and stayed on the VF screen regardless of the zebra switch setting of the VF. When using a VF without the zebra switch such as the BVF-55/55CE, a zebra pattern also appears and stays with this item set to ON.
- **GAMMA TABLE A/B** (Factory-setting: A)
Selects the characteristics of the gamma correction. To obtain more distinct black gradation, set this item to B. Normally set to A.

1-5-3. Use of MENU SELECT Page

You can select only those pages you need, depending on your requirements, to configure the setup menu. To select the pages, use the "MENU SELECT" page in the ENG mode. After making settings in the ENG mode, switch the unit to the USER mode. The setup menu of pages you are likely to use frequently can be configured to access them quickly.

1. Select the "MENU SELECT" page in the ENG mode. (Pages 1/3 to 3/3 are available.)
2. Move the cursor to the item you are likely to use in the USER mode. To turn it ON, press the UP button. An asterisk (*) will appear to the left of the item name. To turn it OFF, press the DOWN button. A bullet (•) will appear to the left of the item name.

1-5-4. Resetting the Setup Menu

Reset the setup menu as follows.

1. Select the "DATA RESET" page in the ENG mode.
2. Move the cursor to the item to be reset and press the UP button.
When "USER" is selected, an adjustment value is returned to its initial value set in the ENG mode. When "ENG" is selected, all settings will return to the initial values set at shipping.

1-5-5. H/SC Phase Adjustment

The H and SC phase adjustments can be performed using the "LEVEL 9/9" page of the setup menu.

Note: Before each adjustment, confirm that the "GENLOCK" item on the "FUNCTION 2/2" page is set to ON.

- **H PHASE**
In the external synchronous mode, the H phase of the video signal can be adjusted using the UP/DOWN button.
- **SC PHASE FINE**
- **SC PHASE COARSE**
In the external synchronous mode, the SC phase of the output signal can be adjusted using the UP/DOWN button. A fine adjustment is enabled using the "SC PHASE FINE" item and a coarse adjustment using the "SC PHASE COARSE" item.

1-5-6. H/V Blanking Width Adjustment

The H/V blanking width adjustments can be performed using the "SG ADJUSTMENT" page of the setup menu.

- **H BLKG WIDTH**
(Factory-setting: 10.9 μ s for NTSC, 12.0 μ s for PAL)
Adjusts the H blanking width using the UP/DOWN button.
- **V BLKG WIDTH** NTSC only (Factory-setting: 20H)
Determines the V blanking width from 19H, 20H or 21H using the UP/DOWN button.

1-5-7. Setting the Matrix

You can select the matrix circuit by setting the "MATRIX TABLE" to A or B on the "LEVEL 8/9" page of the setup menu. At shipping the same matrix is assigned for A and B. You can change the matrix coefficient to obtain a users' desired color reproducibility

[LEVEL 8/9 page]

- **MATRIX TABLE A/B** Select A or B
 - **MATRIX R-G**
 - **MATRIX R-B**
 - **MATRIX G-R**
 - **MATRIX G-B**
 - **MATRIX B-R**
 - **MATRIX B-G**
- Set the matrix coefficient depending on users' requirement.

1-5-8. SKIN DETAIL Adjustment

The amount of SKIN DETAIL signal and its effective area can be set using the "LEVEL 2/9" page of the setup menu.

Equipment required:

VF, Color monitor or Vectorscope

Object: Person's face to be actually shot

Preparation:

Set the "SKIN TONE DTL" item on the "FUNCTION 1/2" page to ON.

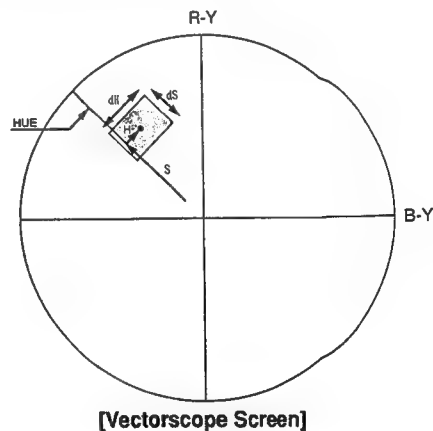
Adjustment Procedures

1. Select the "LEVEL 2/9" page of the setup menu.
2. Set the "SKIN TONE IND" item to ON.
3. Set the effective area of the SKIN DETAIL signal.

[Adjustment items]

- **SKIN TONE HUE** Adjusts the picture hue
- **HUE CENTER (H)**
- **HUE RANGE (dH)**
- **SAT. CENTER (S)**
- **SAT. CENTER (dS)** } Component in the direction of a degree of saturation

The effective area of the SKIN DETAIL signal appears in a zebra pattern on the VF screen, or a monochrome signal showing the effective area is output at the TEST OUT/VIDEO OUT connectors.



4. Adjust the amount of the SKIN DETAIL signal using the UP/DOWN button.

[Adjustment item]

- **SKIN TONE DTL**

Note: After the adjustment is complete, be sure to set the "SKIN TONE IND" item to OFF.

1-5-9. Use of MEASUREMENT MODE

The "MEASUREMENT MODE" page is used to automatically make various settings necessary to measure the following specifications.

[Basic Operation]

1. Perform the white balance adjustment in advance, referring to the operation manual.
2. Select the "MEASUREMENT MODE" page of the setup menu.
3. Push the MENU CANCEL/PRST/ITEM switch to ITEM until the cursor moves to the desired measurement item and press the UP button.
4. Adjust the master pedestal level using the UP/DOWN button. Fulfill other measurement conditions, depending on the table.
5. Make a measurement.
6. After measurement is complete, return the MENU CANCEL/PRST/ITEM switch to CANCEL/PRST. All settings will return to their initial settings.

MEASUREMENT ITEM	AUTO-SET ITEM	MEASUREMENT CONDITION
S/N	Detail → OFF Gamma → OFF Matrix → OFF Chroma → OFF Aperture → OFF	Close the lens iris and adjust the master pedestal level for about 5%.
MODULATION	Detail → OFF Gamma → OFF Matrix → OFF Aperture → OFF	Close the lens iris and adjust the master pedestal level depending on users' requirement. Shoot a chart for modulation measurement. Push the MENU CANCEL/PRST/ITEM to ITEM so that the "OUTPUT" item is selected. Select an output signal ENC, R, G or B and measure the modulation for each channel.
RESOLUTION	Matrix → OFF	Shoot the registration chart and adjust the master pedestal level depending on users' requirement.
SENSITIVITY	White Clip → OFF Knee → OFF	Adjust the master pedestal level depending on users' requirement.
REGISTRATION	Detail → OFF Aperture → OFF	Connect a BKW-402 optional VTR connector unit to the unit. Component signals Y, R-Y and B-Y change to the G, R and B signals. But the composite signals are not obtained at rated level. If you record on the VTR this time, you can not obtain a satisfactory level of video signal. Adjust the master pedestal level depending on users' requirement and measure the level difference between each channel.

1-7. DIAGNOSTIC MODE

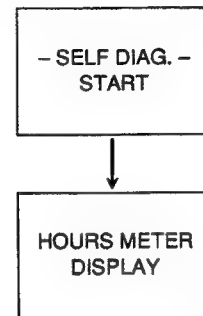
This unit is provided with a diagnostic function. This function displays on the viewfinder and the LCD display on the side panel.

The LCD display also displays the hours meter, and more, battery before end voltage adjustment can also perform on this LCD display.

1-7-1. Operation

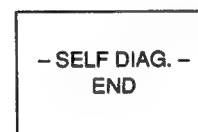
1. Put the unit into STOP mode.
2. Press the DIAGNOSTIC switch on the side panel with a pencil lead or similar object and put into DIAGNOSTIC mode.

Display on the monitor as follows.



(MODE "0", Hours meter is displayed on the LCD display.)

3. Press the ADVANCE button on the side panel, and shift the mode step by step.
4. Press the SHIFT button and perform the mode.
5. When this DIAGNOSTIC mode is ended, press the DIAGNOSTIC switch again.



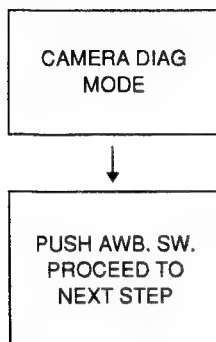
1-7-2. Mode Table

MODE	ITEM/CONTENTS
0	HOURS METER <ul style="list-style-type: none"> • DRUM RUNNING METER • TAPE RUNNING METER • OPERATION METER It is recommended to perform the periodic checks and maintenance based on the hours meter. (Refer to Sec. 2-2)
1	Display and setting of battery before end voltage Display the voltage of battery before end and can be changed. (Refer to Sec. 1-14)
2	LCD display check Check that LCD display's 7 segments are all turned on or off, all lights is put out or not by pressing the SHIFT button.
3	EEPROM check Check that EEPROM on the TC-48B/48BP board is activated normally, and TC-48B/48BP circuit is operated normally. Press the SHIFT button and displayed on the LCD display as follows. <ul style="list-style-type: none"> • EEPROM : OK <div style="text-align: center;">3-0</div> • EEPROM : NG <div style="text-align: center;">3-E</div> When EEPROM is not activated normally, check the TC-48B/48BP circuit or replace the EEPROM.
4	Diagnostic of CAMERA system <ul style="list-style-type: none"> • Diagnostic of Camera PC board • Diagnostic of DP ASSY
5	Diagnostic of VTR system (1) <ul style="list-style-type: none"> • Function key interface check • Function lamp check
6	Diagnostic of VTR system (2) <ul style="list-style-type: none"> • Photo interruptor check
7	Diagnostic of VTR system (3) <ul style="list-style-type: none"> • Photo interruptor check • Tape beginning sensor check • Tape end sensor check
8	Diagnostic of VTR system (4) <ul style="list-style-type: none"> • Drum rotation check • Capstan rotation check • Reel FG (take-up side) check • Reel FG (supply side) check

1-7-3. Self-Diagnostic Function

(1) Camera system

1. Press the ADVANCE button so that the MODE "4" is displayed. Then press the SHIFT button.



2. Push the Auto W/B BAL switch to "WHT" to proceed to next step.
(The self-diagnosis of the camera PC board and DP ASSY switch alternately.)

Menu	VF Screen	Contents
Diagnosis of Camera PC board	<pre> * DEVICE STATUS * I/O EEPROM DP MB : OK MB : OK DET : OK SW1 : OK TG1 : OK SHD : OK SW2 : OK TG2 : OK PR : OK DR : OK VA : OK ENC : OK TG : OK DA : OK SG : OK IF : OK DP : OK RAM : OK DP : OK AT : OK PUSH AWB. SW. </pre>	<p>Confirm that all items are "OK".</p> <p>Check the boards of items that are "NG". But when the DP board is "NG", see the next DP ASSY self-diagnosis menu. When the boards around the CCD block are "NG", contact your service representative.</p>
Diagnosis of DP ASSY	<pre> * DP DIAG STATUS * PULSE DET → PR PR → EN DET : OK R2H : OK DH : OK SHD : OK R1H : OK DL : OK PR : OK R0H : OK Y : OK ENC : OK G2H : OK R-Y : OK SG : OK G1H : OK B-Y : OK G0H : OK VF : OK B0H : OK PUSH AWB. SW. </pre>	<p>Confirm that all items are "OK".</p> <p>Check the input/output signal of items that are "NG" by checking a related board. Because the DP ASSY can not be extended.</p> <p>If the signal is normal, replace the whole DP ASSY as it may be defective.</p>

(2) VTR system

If a result of the diagnostic is different from one in the following table, check the circuit as the following procedure.

1. Install the EX-148 extension board in place of the SY-117C/117CP board. (Never connect the SY-117C/117CP board.)
2. Short between TP5/EX-148 board and TP1(GND)/EX-148 board with a shorting clip.
3. Check whether the signal described in the following table appears or not at TP6 and TP7 by shorting between TP8, TP9, TP10 and TP1(GND).

TP6: IC202-14/MB-440/440P

TP7: IC201-14/MB-440/440P

○ : Short to TP1

TP8	TP9	TP10	TP6	MODE	TP7	MODE
○	○	○	METAL / OXIDE	7	H: CASSE IN	6
○	○		H: OX REC OK	7	H: METAL REC OK	7
○		○	L: RETURN KEY	5	L: CASSE LOCK	6
○			(VTR STBY / $\overline{\text{SAVE SW}}$)		(L: TC READY)	
	○	○	(H: RFALARM)		(L: CAM READY)	
	○		L: EJECT KEY	5	(L: SV READY)	
		○	L: FF KEY	5	L: STOP KEY	5
			L: REW KEY	5	L: PLAY KEY	5

4. When the signal appears as described in the above table, the SY-117C/117CP board has a trouble.

When the signal does not appear as described in the table, check a related circuit as following procedure.

(1) Remove the all plug in printed circuit boards including the DP ASSY.

Then install the EX-148 extension board in the position of the SY-117C/117CP board.

(2) Short between TP5/EX-148 board and TP1(GND)/EX-148 board, TP50(+5V)/EX-148 board and TP508/TC-48B/48BP board with shorting clips. Make sure that the SL10/TC-48B/48BP board is shorted, SL11 is opened.

(3) Install the Battery or use the AC adaptor. Turn OFF the POWER switch.

(4) Check a related circuit.


(NOTE) • Within a few seconds, check a related circuit.
• After the check is completed, remove the shorting clips immediately.

The circuit is normal when measuring as following.

- Photo interrupter (Ref. No. PD)
 - H : more than 0.6 V at collector
 - L : less than 0.3 V at collector

- Transistor
 - H : more than 4 V at collector
 - L : 0 V at collector

• VTR System-1

Procedure	LCD display	VF screen	Related circuit
Press the ADVANCE button so that the MODE "5" is displayed.		VTR DIAG MODE-1 FUNCTION KEY/LAMP CHECK	
Press the SHIFT button.	5	PUSH FF KEY	
Press the F FWD button.	5	<div>PUSH FF KEY OK</div> <div>↓</div> <div>PUSH REW KEY</div>	S2, CN1-6/KY-124→CN59-6/MB-440/440P →IC202-7/MB-440/440P
Press the REW button.	5	<div>PUSH REW KEY OK</div> <div>↓</div> <div>PUSH PLAY KEY</div>	S4, CN1-4/KY-124→CN59-4/MB-440/440P →IC202-9/MB-440/440P

(NOTE) If "OK" is displayed without pressing the appointed button, check a related circuit.

Procedure	LCD display	VF screen	Related circuit
Press the PLAY button.	5	<div>PUSH PLAY KEY OK</div> <div>↓</div> <div>PUSH STOP KEY</div>	S3, CN1-3/KY-124→CN59-3/MB-440/440P →IC201-9/MB-440/440P
Press the STOP button.	5	<div>PUSH STOP KEY OK</div> <div>↓</div> <div>PUSH EJECT KEY</div>	S1, CN1-7/KY-124→CN59-7/MB-440/440P →IC201-7/MB-440/440P
Press the EJECT button.	5	<div>PUSH EJECT KEY OK</div> <div>↓</div> <div>PUSH START KEY</div>	S5, CN1-5/KY-124→CN59-5/MB-440/440P →IC202-6/MB-440/440P

Procedure	LCD display	VF screen	Related circuit
Press the START button.	5	<div>PUSH START KEY OK</div> <div>↓</div> <div>PUSH RETURN KEY</div>	Connect the SY-117C/117CP board to the EX-148 board CN54-A2/MB-440/440P→CN1-48/SY-117C/117CP
Press the RETURN (Lens/External VTR/Left Side Panel) button. Check that the following lamps are turned on. <ul style="list-style-type: none"> • REC TALLY (Viewfinder) • BATTERY INDICATOR (Viewfinder) • TALLY • PLAY • F FWD • REW • WARNING 	5	<div>PUSH RETURN KEY OK</div> <div>↓</div> <div>FUNCTION LAMP ALL ON PUSH ADVANCE</div>	<ul style="list-style-type: none"> • Lens CN54-B5/MB-440/440P→IC202-3/MB-440/440P • External VTR CN73-A4/MB-440/440P→IC202-3/MB-440/440P • Left Side Panel CN22-B6/MB-440/440P→IC202-3/MB-440/440P Check for continuity <ul style="list-style-type: none"> • PLAY lamp IC1-3/AU-97/97P→CN6-12/MB-440/440P →CN59-10/MB-440/440P→CN1-10/KY-124 • F FWD lamp IC1-1/AU-97/97P→CN6-14/MB-440/440P →CN59-8/MB-440/440P→CN1-8/KY-124 • REW lamp IC1-2/AU-97/97P→CN6-13/MB-440/440P →CN59-9/MB-440/440P→CN1-9/KY-124

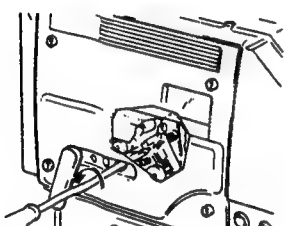
Procedure	LCD display	VF screen	Related circuit
Press the ADVANCE button so that the MODE "6" is displayed.	6	VTR DIAG MODE-2 PHOTO INT. CHECK-1	
Press the SHIFT button.	6	ROTATE CAM GEAR POSITION A C-IN SW I C-LCK SW L	
<p>Turn the gear by the phillips type screwdriver into the hole for the gear.</p>  <p>Confirm that the display on the VF screen is changed as described in the table-1 in the next page by turning the gear.</p>	6	ROTATE CAM GEAR POSITION C-IN SW C-LCK SW	<ul style="list-style-type: none"> • C-IN SW PD34-3/MB-440/440P→Q34-C/MB-440/440P →IC201-1/MB-440/440P • C-LCK SW PD31-3/MB-440/440P→Q31-C/MB-440/440P →IC201-3/MB-440/440P


Table-1

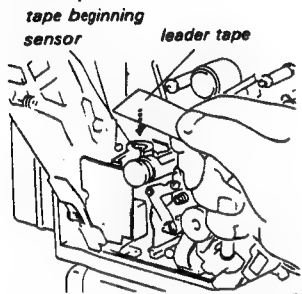
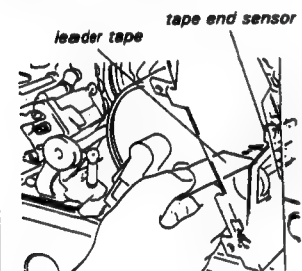
POSITION	C-IN SW	C-LCK SW	MODE	CODE
1	O	O	B0	0001
2	O	O	EJECT	0011
3	O	O	B1	0010
4	O	L	STBY	0110
5	O	L	B2	0111
6	O	L	LOAD	0101
7	I	L	B3	0100
8	I	L	FF/REW	1100
9	I	L	B4	1101
A	I	L	STOP	1111
B	I	L	B5	1110
C	I	L	FWD	1010
D	I	L	B6	1011
E	I	L	REV	1001
F	I	L	B7	1000

- [C-IN SW] O:OUT I:IN
When the cassette is not inserted, "0" is always displayed.
- [C-LCK SW] O:OPEN L:LOCK
- [CODE]
Remove the mechanical deck block and extend it by the Extension Harness which is prepared for service.
 - BIT-3 (4)/SR-40→CN1-8/TB-5→CN44-8/MB-440/440P→CN1-36/SY-117C/117CP
 - BIT-2 (3)/SR-40→CN1-9/TB-5→CN44-9/MB-440/440P→CN1-37/SY-117C/117CP
 - BIT-1 (2)/SR-40→CN1-10/TB-5→CN44-10/MB-440/440P→CN1-38/SY-117C/117CP
 - BIT-0 (1)/SR-40→CN1-11/TB-5→CN44-11/MB-440/440P→CN1-39/SY-117C/117CP

• VTR system-3



This mode should be performed after setting POSITION to "8" in MODE "6".

Procedure	LCD display	VF screen	Related circuit
Press the ADVANCE button so that the MODE "7" is displayed.		VTR DIAG MODE-3 PHOTO INT. CHECK-2	
Press the SHIFT button.	7	PUSH SENS SW M/O M M-REC D O-REC D NEXT-PLAY	
Press the METAL/OXIDE switch. (This switch detects an oxide and "O" is displayed.)	7	PUSH SENS SW M/O O M-REC D O-REC D NEXT-PLAY	PD33-3/MB-440/440P→Q33-C/MB-440/440P →IC202-1/MB-440/440P
Press the METAL MISS REC switch. ("E" of enable is displayed.)	7	PUSH SENS SW M/O M M-REC E O-REC D NEXT-PLAY	PD32-3/MB-440/440P→Q32-C/MB-440/440P →IC201-2/MB-440/440P
Press the OXIDE MISS REC switch. ("E" of enable is displayed.)	7	PUSH SENS SW M/O M M-REC D O-REC E NEXT-PLAY	PD35-3/MB-440/440P→Q35-C/MB-440/440P →IC202-2/MB-440/440P
Press the PLAY BUTTON.	7	TAPE TOP/END CHECK TOP	

Procedure	LCD display	VF screen	Related circuit
<p>Close the leader tape such as a piece of aluminium with the tape beginning sensor. (The tape beginning is detected and "DET" is displayed on the VF screen.)</p>  <p><i>tape beginning sensor</i> <i>leader tape</i></p>	7	<div>TAPE TOP/END CHECK TOP DET</div> <div>↓</div> <div>TAPE TOP/END CHECK TOP DET END</div>	<p>Short between TP47/EX-148 board and TP50 (+5V) /EX-148 board with a shorting clip. After making sure that the CN in the parentheses is "H", check the following points.</p> <p>Normally, the points are "H", when closing the leader tape, the points are "L".</p> <p>IC1-3/FE-4(IC1-1 "H")</p> <p>CN43-4/MB-440/440P(CN43-5 "H")</p> <p>CN1-46/SY-117C/117/CP(CN1-47 "H")</p>
<p>Close the leader tape such as a piece of aluminium with the tape end sensor. (The tape end is detected and "DET" is displayed on the VF screen.)</p>  <p><i>leader tape</i> <i>tape end sensor</i></p>	7	<div>TAPE TOP/END CHECK TOP DET END DET</div> <div>TAPE TOP/END CHECK TOP DET END DET PUSH ADVANCE</div>	<p>Short between TP47/EX-148 board and TP1 (GND) /EX-148 board with a shorting clip. After making sure that the CN in the parentheses is "H", check the following points.</p> <p>Normally the points are "H", when closing the leader tape, the points are "L".</p> <p>IC1-3/FE-4(IC1-1 "H")</p> <p>CN43-4/MB-440/440P(CN43-5 "L")</p> <p>CN1-46/SY-117C/117CP(CN1-47 "L")</p>

- VTR system-4

This mode should be performed after setting POSITION to "8" in MODE "6".

Procedure	LCD display	VF screen	Related circuit
Press the ADVANCE button so that the MODE "8" is displayed.		<div>VTR DIAG MODE-4 DRUM/CAP MOTOR ON</div>	
Press the SHIFT button.	8	<div>DRUM ON OK</div> <div>↓</div> <div>DRUM ON OK NEXT-PLAY</div>	<ul style="list-style-type: none"> When "NG" is displayed. Refer to fig. 1. (Page. 1-33)
Press the PLAY button.	8	<div>CAP F-ON T-RL FG</div> <div>↓</div> <div> CAP F-ON OK T-RL FG OK NEXT-PLAY </div>	<p>When "NG" is displayed.</p> <ul style="list-style-type: none"> CAP F-ON Refer to fig. 2. (Page. 1-34) T-RL FG PD37-3/MB-440/440P→Q37-C/MB-440/440P→CN1-3/SY-117C/117CP
Press the PLAY button.	8	<div>CAP R-ON S-RL FG</div> <div>VF screen</div> <div>↓</div> <div> CAP R-ON OK S-RL FG OK PUSH ADVANCE </div>	<p>When "NG" is displayed.</p> <ul style="list-style-type: none"> CAP R-ON Refer to fig. 2. (Page. 1-34) S-RL FG PD36-3/MB-440/440P→Q36-C/MB-440/440P→CN1-4/SY-117C/117CP
Press the ADVANCE button and the MODE "0" is displayed.		HOURS METER DISPLAY	

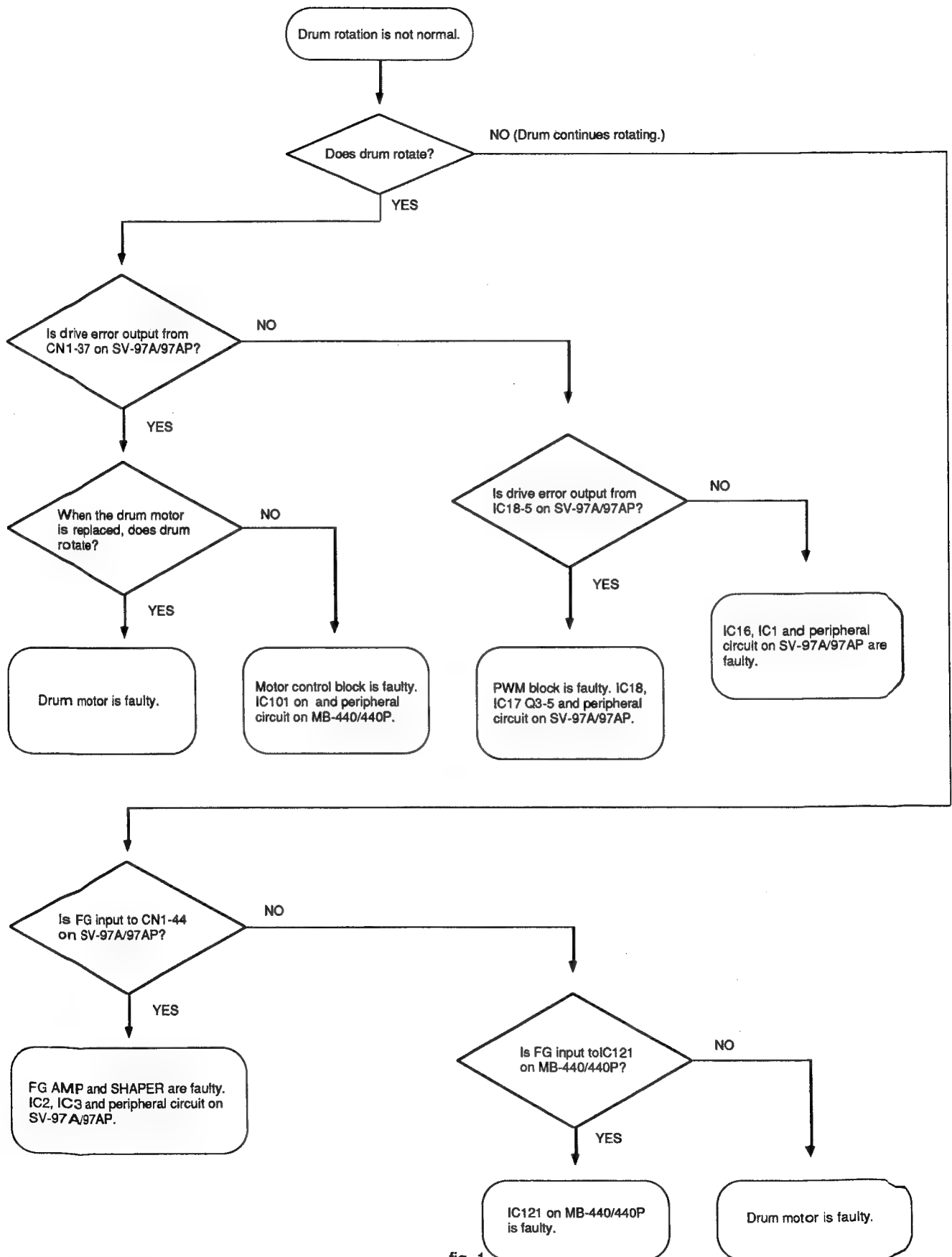


fig. 1

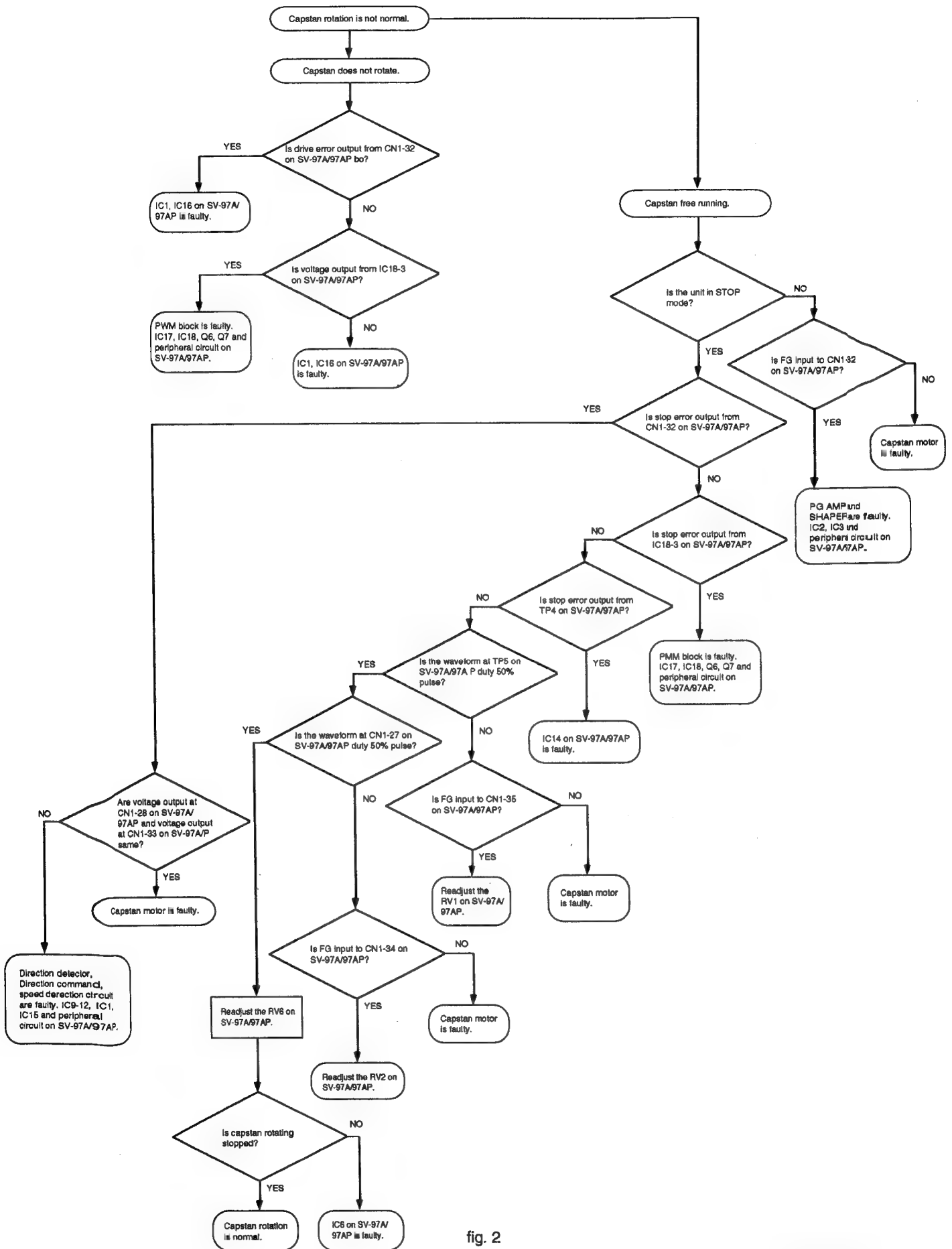
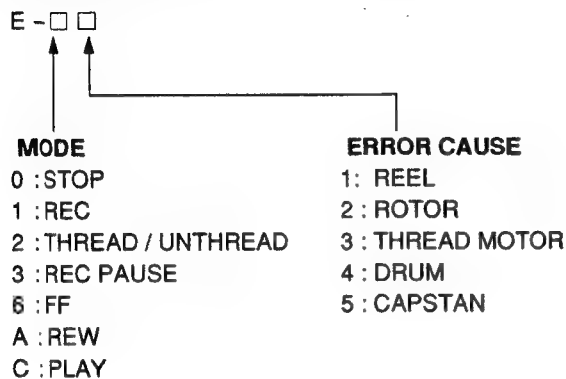


fig. 2

1-8. ERROR INFORMATION

1-8-1. Error Code Display

When the tape is slackened in the unit, its error cause and its error mode are displayed on the LCD Display.



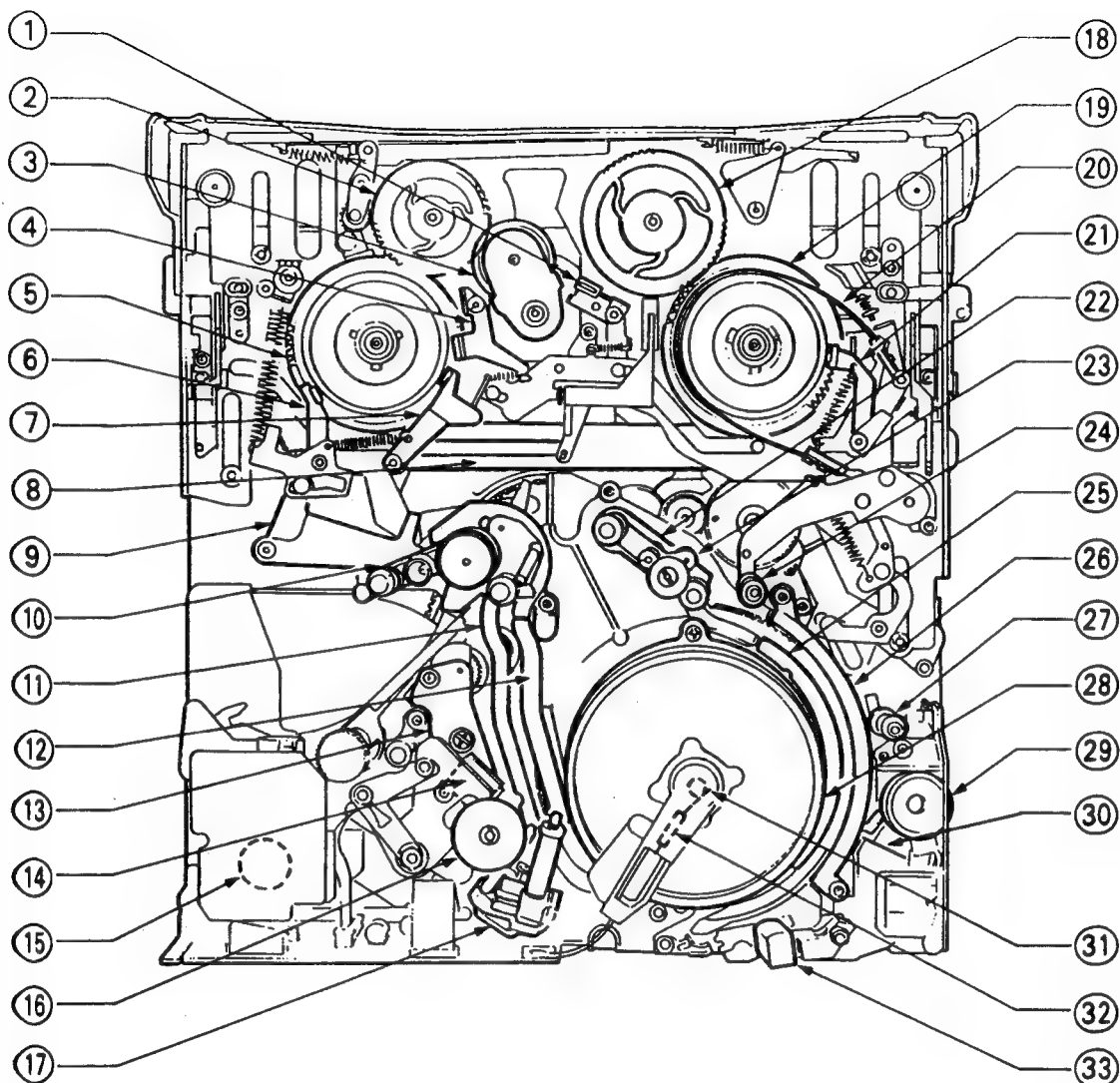
1-8-2. Error Information

If errors are detected when the power is turned on, the following warnings will be displayed.

Warning	Problem	Correction
Warning lamp lights up. Alarm sounds continuously. "SERVO" is displayed on the LCD. REC tally lamp blinks at a 4 Hz period.	An error was detected in the communication between the system controller CPU and servo MPU when the power was turned on.	Check the communication path between the SY board and SV board. The boards may have been disconnected, etc.
WARNING lamp blinks at a 2 Hz period.	An error was detected in the communication between the system controller CPU and TC MPU when the power was turned on.	Check the communication path between the SY board and TC board. The boards may have been disconnected, etc.
"EE-00" is displayed for 20 sec. at the TIME CODE part of the LCD.	An error was detected in the communication between the TC MPU and NOVRAM when the power was turned on.	Check the communication path between the MPU and NOVRAM on the TC board. The NOVRAM (IC515) may have been improperly inserted, etc.

1-9. LOCATION OF MAIN PARTS

1-9-1. Location of the Mechanical Main Parts / Components

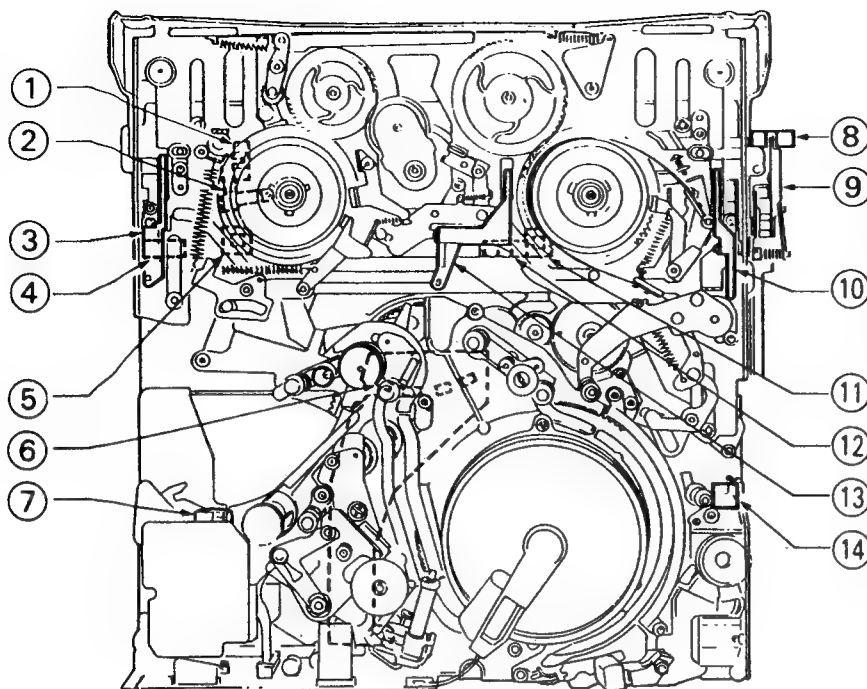


- ① Supply Side Main Brake
- ② Take-up Side Idler
- ③ Gear
- ④ Take-up Side Main Brake
- ⑤ Take-up Side Reel Table
- ⑥ Take-up Side Sub Soft Brake
- ⑦ Take-up Side Soft Brake
- ⑧ Reel Slider
- ⑨ Main Pinch Arm
- ⑩ Sub-pinch Arm

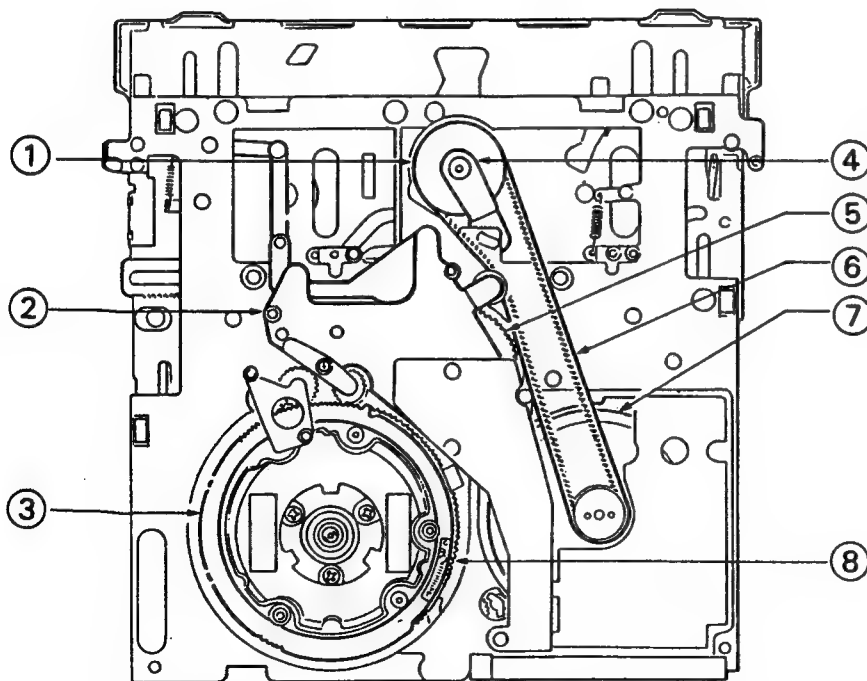
- ⑪ Take-up Side Rail (O)
- ⑫ Take-up Side Rail (I)
- ⑬ Threading Gear
- ⑭ Audio/TC Confi Head
- ⑮ Threading Motor
- ⑯ IR-3
- ⑰ Take-up Side Sub-base
- ⑱ Supply Side Idler
- ⑲ Supply Side Reel Table
- ⑳ Tension Regulator Band

- ㉑ Supply Side Soft Brake
- ㉒ Supply Side Base
- ㉓ Supply Side Sub-base
- ㉔ Tension Regulator
- ㉕ Supply Side Rail (O)
- ㉖ Supply Side Rail (I)
- ㉗ TG-1
- ㉘ Drum
- ㉙ IR-1
- ㉚ Full Erase Head

- ㉛ Slip Ring
- ㉜ Brush
- ㉝ CTL Head

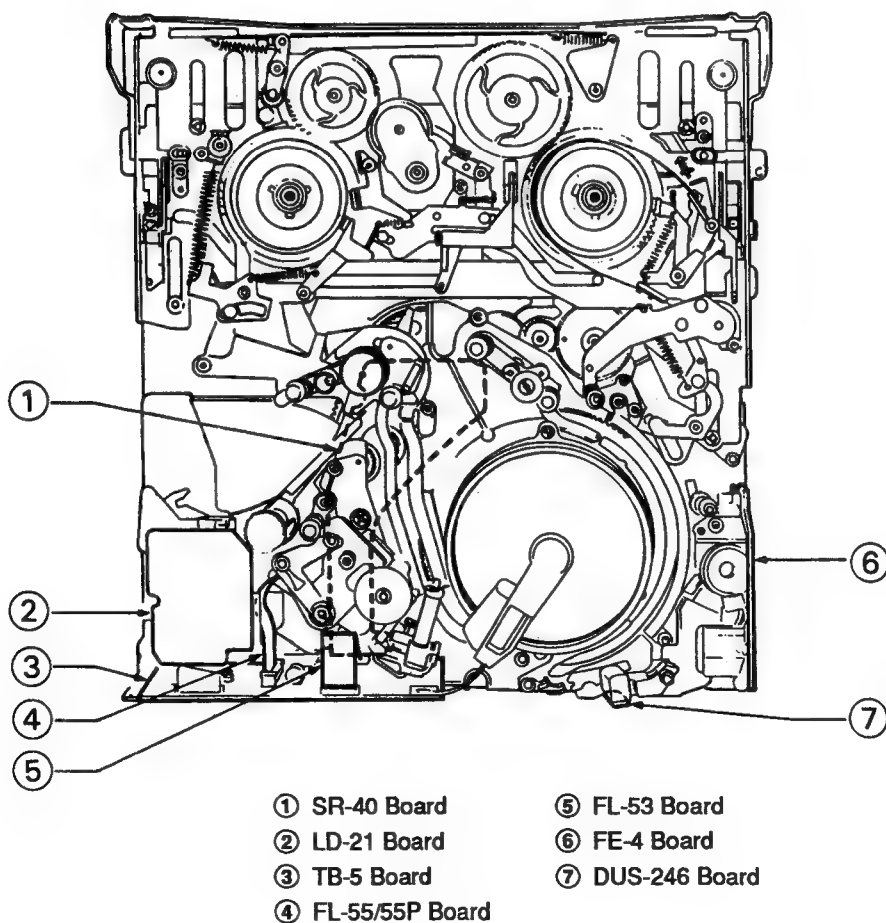
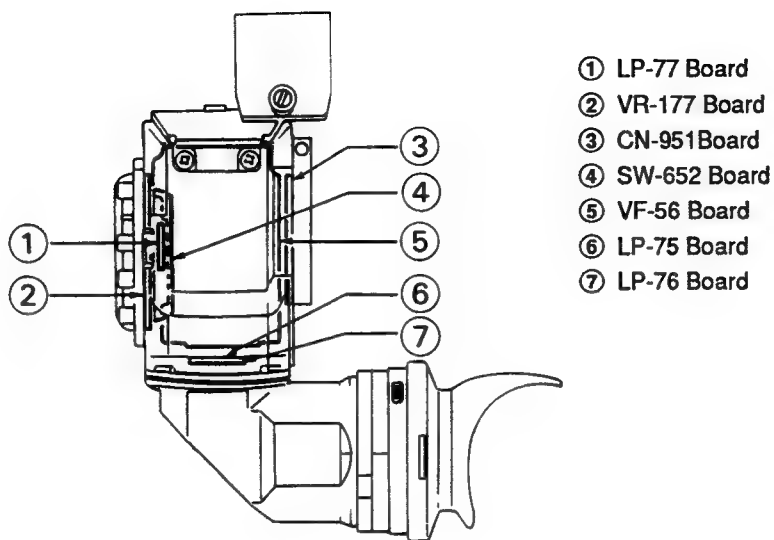


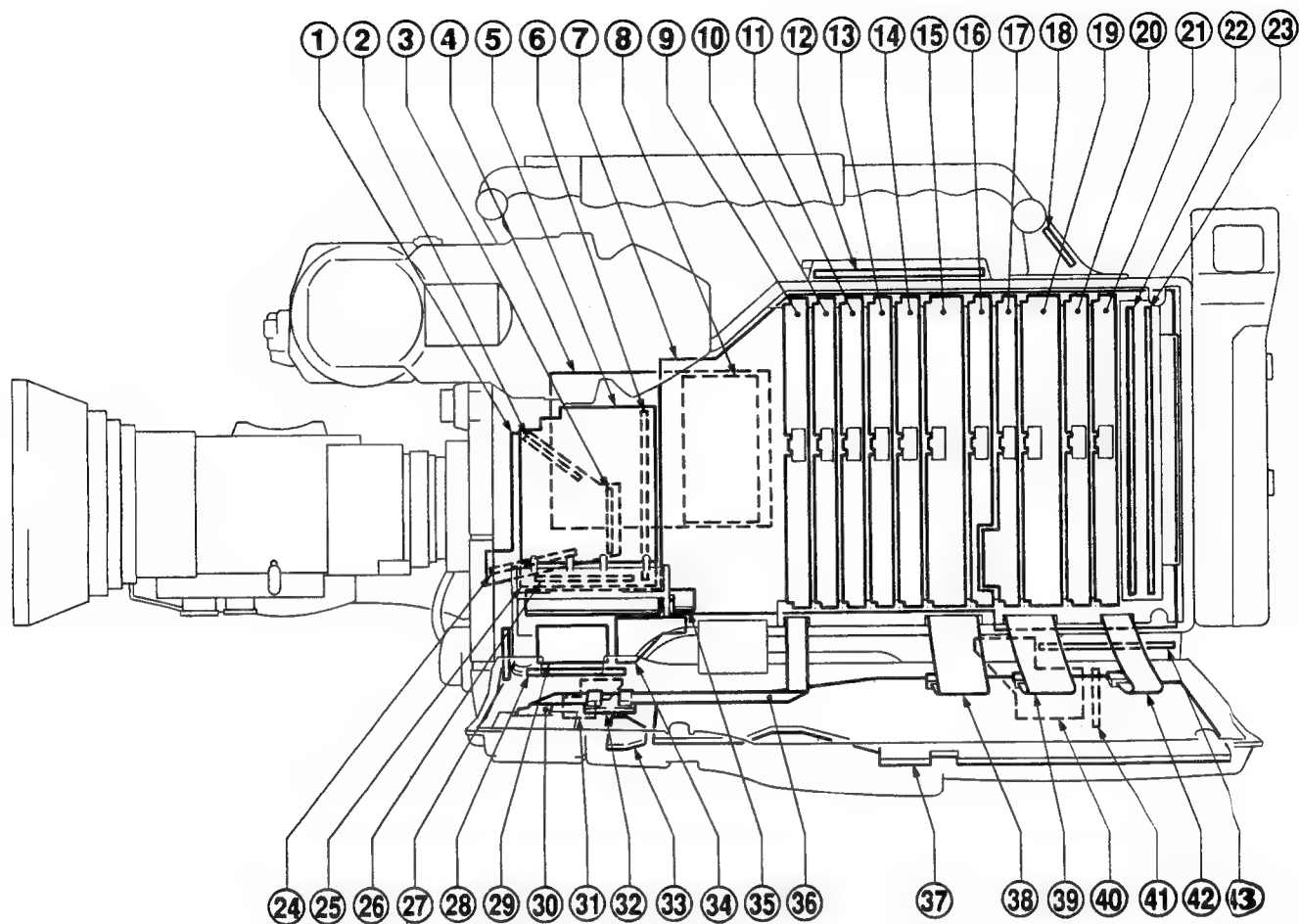
- ① Cassette Detection Sensor
- ② cassette Detection Shutter
- ③ Miss-REC Lever A
- ④ Miss-REC Sensor
- ⑤ Take-up Reel Rotation Detector
- ⑥ Mechanical Function Control Sensor
- ⑦ Tape Beginning Sensor
- ⑧ Cassette-up Compartment Lock Sensor
- ⑨ Lock Arm
- ⑩ Miss-REC Lever B
- ⑪ Supply Reel Rotation Detector
- ⑫ Metal/oxide Selector
- ⑬ Metal Detection Lever
- ⑭ Tape End Sensor



- ① Relay Pulley
- ② Cam Gear Base
- ③ Threading Ring T
- ④ Gear Base
- ⑤ Function Cam
- ⑥ Timing Belt
- ⑦ Capstan
- ⑧ Threading Ring S

1-9-2. Location of the Printed Circuit Boards





- | | | | | |
|---------------------|-----------------------|------------------|---------------------|-----------------|
| ① CN-775 Board | ⑪ VP-24/24P Board | ⑳ DA-66 Board | ㉑ SW-618 Board | ㉒ HP-43 Board |
| ② BI-64(B) Board | ⑫ KY-124 Board | ㉓ DP-196 Board | ㉔ CN-907 Board | ㉕ FL-57 Board |
| ③ BI-64 (G) Board | ⑬ VDA-11/11P Board | ㉔ DP-197 Board | ㉕ VR-70 Board | ㉖ PS-162B Board |
| ④ PS-328 Board | ⑭ AFM-6/6P Board | ㉕ BI-64(R) Board | ㉖ SW-625 Board | |
| ⑤ DR-195 Board | ⑮ AU-97/97P Board | ㉖ PA-159 Board | ㉗ SW-544 Board | |
| ⑥ TG-118/118P Board | ⑯ SV-97A/97AP Board | ㉗ BC-24 Board | ㉘ FL-151 Board | |
| ⑦ MB-440/440P Board | ⑰ SY-117C/117CP Board | ㉘ SW-357 Board | ㉙ TC-48B/48BP Board | |
| ⑧ PS-329 Board | ⑱ SW-291 Board | ㉙ IO-74 Board | ㉚ FL-45 Board | |
| ⑨ VA-128 Board | ⑲ IF-393/393P Board | ㉚ SW-619 Board | ㉛ FL-46 Board | |
| ⑩ AT-75 Board | ㉚ AD-83 Board | ㉛ FL-149 Board | ㉜ CN-908 Board | |

1-10. PRINTED CIRCUIT BOARDS

SYSTEM	CIRCUIT BOARD	CIRCUIT FUNCTION
CAMERA	CN-775	Connector PCB for BI boards
	BI-64 (R) BI-64 (G) BI-64 (B)	CCD mount
	TG-118/118P	Timing Generator
	PA-159 BC-24	Pre-amp (Sample & Hold)
	DR-195	CCD Driver
	VA-128	Video Amp, Black Set, Total Gain Change, Shading Compensator
	AT-75	Auto White/black Function, VF Character Generator, System Controller, Audio Level Detector
	AD-83	Analog-to-Digital Convertor
	DA-66	Digital-to-Analog Convertor
	DP-196 DP-197	Digital Processor
	FL-151	Relay Board between DP boards
	PS-328 PS-329	DC-to-DC Convertor
	IO-74	Parallel/Serial Data Convertor, Lens Signal Relay Board
	CN-907	Connector PCB for Memory Card Assy
	SW-554	SAVE-STBY, Color Bars ON/OFF, DCC ON/OFF, GAIN Select Memory A/B/Presel SW
	SW-357B	Auto White/Black SW VTR Start/Stop SW Shutter ON/OFF Select
	SW-618	RET SW
	SW-619	MENU Page ON/OFF, ITEM CANCEL/PRST SW
	SW-625	UP SW, DOWN SW
	IF-393/393P	26P Interface, Logic, VF Marker Gen
	CN-908	Connector PCB for IF-393/393P

SYSTEM	CIRCUIT BOARD	CIRCUIT FUNCTION
VIDEO	VDA-11/11P	CTDM and C-Modulator
	AFM-6/6P	Y-Modulator, AFM
	VP-24/24P	Video Playback, Head Select Pulse Generator
AUDIO	AU-97/97P	Audio REC/PB Processor
	TB-5	Terminal Board, Audio Confi PB
	FL-55/55P	Audio Head AMP, Relay Board for TB and A/T Head
SERVO	SV-97A/97AP	Drum/Capstan Servo
SYSTEM CONTROL	SY-117 /117CP	System Control
	KY-124	Function Key Board
TIME CODE	TC-48B/48BP	Time Code Generator, Audio Level Control, Audio Monitor AMP, SW and Indicator for Audio and TC
	HP-43	Head Phone
	VR-70	Volume
Power	PS-162B	Power Distributor
	PS-328 PS-329	DC-to-DC Convertor
SENSOR	FE-4	Full Erase, Dew and End Sensor
	LD-21	Loading Motor Driver and END Sensor
	SR-40	Mechanical Position Sensor

SYSTEM	CIRCUIT BOARD	CIRCUIT FUNCTION
OTHERS	MB-440/440P	Mother Board
	SW-291	Back Tally
	FL-45	Relay Board for MB and TC
	FL-46	Relay Board for MB and TC
	FL-53	Relay Board for TB and SR
	FL-57	Relay Board for PS and TC
	FL-149	Relay Board for Memory Card Assy and CN-907
	EX-148 EX-406	Extension Board

SYSTEM	CIRCUIT BOARD	CIRCUIT FUNCTION
VIEW-FINDER	VF-56	Drive and Video Amp for Viewfinder, Peaking Signal Generator
	LP-75	BATT/REC/G TALLY LED
	LP-76	① (STATUS WARNING)/REC/VTR SAVE LED
	LP-77	Front Tally LED
	VR-177	Contrast, Bright, Peaking, Audio Level (CH-1) VR
	SW-652	Tally ON/OFF, Audio Level Indicator ON/OFF, Zebra ON/OFF SW
	CN-951	Connector for VF Cable

1-11. Circuits Description

1-11-1. Camera System Circuits

(1) CCD Drive System

(TG-118/118P board, DR-195 board, PA-159 board, BI-64(R)/64(G)/64(B) boards)

• TG-118/118P board

The TG-118 board outputs the pulses for driving the CCD to the DR-195 board and the pulses for sampling the CCD output to the PA-159 board.

The driving pulses are synchronized with the HD and VD pulses input from the DP-197 board and are output.

Pulses are generated from the VCO clock (36 MHz) of the board. The clocks for the digital processing circuit of the main unit (36 MHz, 18 MHz) are also output to the main unit.

CCD V-sub voltage and white shading data, etc. are also stored in the EEP ROM of the TG-118/118P board.

• DR-195 board

The DR-195 board converts the pulses from the TG-118/118P board to directly drive the CCD. The converted pulses are transmitted to the CCD via the BI-64 (R)/64 (G)/64 (B) board. The board also has a circuit which makes +29 V from +15 V for the V-sub voltage. Furthermore, the board also has an interface circuit for the optical filter.

• BI-64 (R)/BI-64 (G)/BI-64 (B) boards

The CCD is mounted on the BI-64 (R)/64 (G)/64 (B) boards. These boards supply the driving pulses and control voltages to the CCD.

The signals output from the CCD is sent to the PA-159 board via the emitter follower.

• PA-159 board

The PA-159 board extracts video signals from the CCD signals output from the BI-64 (R)/64 (G)/64 (B) boards by correlated double sampling circuit, amplifies them by about 1.8 times, and then outputs the resultant to the VA-128 board.

(2) Video Signal System (VA-128 board, AD-83 board, DA-66 board, DP-196/197 board)

• VA-128 board

The VA-128 board amplifies the video signals output from the PA-159 board and performs various processings such as black shading correction, gain-up control, blanking cleaning, white shading correction, feedback clamping and white balance adjustment for the signals.

In addition, it also switches video signals and the TEST SAW signal.

• AD-83 board

To convert the analog R, G, B video signals to digital signals, the AD-83 board consists of the sample/hold circuit and A/D converter.

It generates clocks required for A/D conversion and the digital processing circuit from the clocks of the TG-118/118P board.

• DA-66 board

The DA-66 board converts composite video signals, VF monochrome signals for VF and component signals from the digital processing circuit of the DP-196/197 board to analog.

The board also adds a SYNC signal to a component Y signal. For an UC model, a setup is also added.

• DP-196/197 board

The DP-196/197 board adds matrix signals and detail signals to analog-to-digital converted R, G, and B signals. It performs the processings such as flare compensation, pedestal control, gamma correction, knee correction and white clipping for the signals.

In addition, it converts these signals to the Y, R-Y, B-Y signals or monochrome signal for VF and outputs them to the DA-66 board. It also performs the following.

- Generates built-in color bar signals and switches them with the main line signals.
- Creates detail and aperture signals from digital R and G signals.
- Creates composite video signals from Y, R-Y, and B-Y signals and outputs them to the DA-66 board.
- Generates various synchronous signals, detects a genlock signal, and also detects H, and a subcarrier phases.
- Detects signals for performing auto iris, flare compensation, DCC, auto white/black balance.
- Detects black/white shading, generates compensation waveforms for it and outputs them to the VA-128 board.
- Detects black levels and outputs the feedback damp voltage to the VA-128 board
- Generates TEST SAW waveforms and output them to the VA-128 board.

(3) Power Voltage Supply System
(PS-328 Board, PS-329 Board)

• **PS-328 Board**

The PS-328 board receives DC voltages (UNREG) externally supplied and outputs all voltages required by the camera and VTR other than the UNREG using the switching regulator.

To cope with short-circuit of all outputs, it outputs the SENSE voltage to the PS-329 board.

• **PS-329 board**

The PS-329 board controls almost all voltages output by the PS-328 board. (Some fine voltage adjustments are performed using the PS-328 board for +7.5 V and +9 V). It is incorporated with the UNREG voltage SENSE to limit the operating range to approximately 10V to 17V and with the short-circuit detection POWER DOWN circuit so that all voltages will not be output when any one output to the PS-328 board drops to 0V.

By applying time constants when UNREG is cut, it prevents the outputs of PS-328 board from dropping.

(4) Auto System (AT-75 board)

• **AT-75 board**

The AT-75 board consists mainly of the microcomputer. It controls the camera section according to the instructions stored in the ROM. It mainly analyzes instructions of the function switches, video system detection data and analog data, and outputs various control signals and compensation signals to the boards. It also outputs status information and self-diagnosis information from the character generator as character data. It incorporates the RM-P9 (available separately) interface.

(5) Interface System (IF-393/393P Board)

• **IF-393/393P**

The IF-393/393P board consists mainly of the VIDEO TEST signal output block, VF signal selection logic and output block, external VTR control logic block, 26-pin interface, and GENLOCK signal detector.

When outputting, it detects whether each external connector is being connected or not and turns off the power of unused circuits to save power.

1-12. FUNCTION OF THE SENSORS

- (1) Miss-REC Switch (for metal particle tape)
This is a record-proof switch for metal particle tape.
- (2) Miss-REC Switch (for oxide tape)
This is a record-proof switch for oxide tape.
- (3) Oxide/Metal Particle Tape Detection Switch
This switch detects whether an oxide tape or a metal particle tape is being used.
- (4) Cassette-in Switch
This switch detects whether a cassette is being inserted.
- (5) Cassette-up Compartment Lock Switch
This switch detects that the Cassette-up Compartment is locked.
When the Cassette-up Compartment is locked, threading is performed.
When EJECT mode, the Cassette-up Compartment is opened, the EJECT mode is finished.
- (6) Cam Position Sensor
This sensor detects whether the Cam is moved to the designed position or not.
- (7) Temperature Detection Sensor
This sensor detects the temperature and then Black correction is performed.

1-13. USE UNDER SPECIAL ENVIRONMENT (MEASURE FOR COLD AREA)

The unit is guaranteed its operation under the temperature of 0°C to 40°C.

When the unit is used under 0°C, cover-cloth against the cold (LKW-200) is recommended.

1-14. VOLTAGE CHANGING OF BATTERY BEFORE END

Voltage of battery before end can be changed by the following procedures described below.

Setting available range : 11.0 V to 13.0 V

Setting available minimum unit : 0.1 V

When the unit is shipped, this is set to 11.30V.

1. Press the DIAGNOSTIC switch on the side panel, and put into the DIAGNOSTIC mode.
(Refer to Sec.1-7)

2. Press the ADVANCE button on the side panel, so that set the MODE "1".
Then, the voltage of battery before end is displayed on the LCD-display.



3. Press the SHIFT button on the side panel so that blinking the first digit.



4. Set the desired figure pressing the ADVANCE button.
5. Press the SHIFT button so that blinking the decimal digit.



6. Set the desired figure pressing the ADVANCE button.
7. Press the SHIFT button. Then the desired voltage is stored in the ROM.
If the value is stored in the ROM, "O" is displayed automatically.



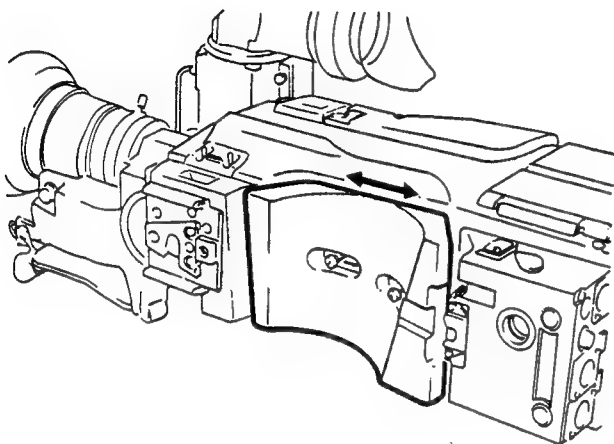
If the value can be not stored in the ROM because of the error, the following is displayed.



In this case, press the ADVANCE button and then repeat the above procedures.

1-15. RELOCATING THE SHOULDER PAD

Loosen the two fixing screws in the figure and relocate the shoulder pad to the desired position. Then tighten the screws. The shoulder pad can be moved ± 10 mm back and forth.



1-16. REMOTE CONTROL OF THE CAMERA SYSTEM

The camera system of this unit can be remotely controlled with the remote control unit RM-P9 (optional). Connect a REMOTE connector of the unit to a REMOTE connector of the RM-P9 with a cable. A remote cable of up to 100m can be used.

1-17. SUPPLIED ACCESSORIES

Supplied accessories are as follows.

- (1) Shoulder strap
- (2) Extension boards (EX-148, EX-406)
- (3) Rain cover
- (4) Tripod adaptor (VCT-14)
- (5) Microphone
- (6) Setup Card (BSC-1)
- (7) Carrying case (LC-201)....(for BVW-D600P)
- (8) Operation manual
Maintenance manual vol-1, vol-2

1-18. OPTIONAL ACCESSORIES

The followings are the accessories. Use the suitable accessory according to need.

- AC Power Adaptor : AC-550/550CE

The VTR can be driven by an AC power source from the AC adaptor, AC-550/550CE. The AC-550/550CE is worldwide type of adaptor, and can be used with 100 / 120 / 220 / 240V commercial power supplies just by setting the voltage selector to the appropriate position for a stable supply of DC power.

- Remote Control Unit : RM-P9

The unit can be remotely controlled by connecting a REMOTE connector of the unit to a REMOTE connector of the RM-P9 with a cable of up to 100m.

- Battery Pack : NP-1B, NP-1A, BP-90A, BP-90

They are the chargeable 12V battery packs. The NP-1B and NP-1A have a capacity of 2.3 Ah and that of 1.7 Ah each. The BP-90A and BP-90 have that of 5.0 Ah and that of 3.5 Ah each.

- Battery Pack : BP-L60

The BP-L60 is a rechargeable lithium-ion battery pack. It features a capacity of 60 Wh and a normal voltage of 14.4Vdc.

- Battery Charger : BC-1WA, BC-1WB, BC-1WD/1WDCE, BC-210/210CE, BC-410/410CE

The BC-1WD/1WDCE battery charger is designed to charge NP-1/1A/1B battery packs. Four NP-1/1A/1B battery packs can be inserted at one time, and will be charged in sequence automatically.

The BC-210/210CE battery charger is designed to charge BP-90A/90 battery packs. Four BP-90A/90 battery packs can be inserted and charged at one time automatically.

BC-410 is the B series battery charger designed to connect 4 NP-1/1A/1B battery packs, and 4 BP-90A/90 battery packs (total of eight batteries) simultaneously, and charges them one by one.

- Battery Charger : BC-L100/L100CE

The BC-L100/L100CE is capable of simultaneous continuous charging of any four of the battery packs, BP-L60, NP-1B or BP-90A. When charging the NP-1B or BP-90A, attach the NP-1B to the DC-L1 battery adaptor or the BP-90A to the DC-L90 battery adaptor.

- Battery Adaptor : DC-500, DC-520, DC-210

The DC-500 is a battery adaptor to hold a BP-90A/90 battery pack. The DC-520 can hold two NP-1B/1A pack with the standard battery case.

In use of the DC-500, the standard battery case should be removed.

- Battery Adaptor : BKW-L601

The BKW-L601 is a battery adaptor used to fit a BP-L60 lithium-ion battery pack to a BVW. To use this adaptor, remove the standard battery case.

The NP-1 B and BP-90A Ni-cd battery packs are also used by using the DC-L1 and DC-L90 battery adaptor respectively.

- Wireless Microphone System

UHF portable tuner : WRR-28L/28M/28H

UHF Synthesized tuner: WRR-810A

UHF Synthesized diversity tuner: WRR-860A

UHF transmitter : WRT-27

The audio sound can be recorded on the tape without wire cable by using these wireless microphone system.

- Playback Adaptor : VA-500/500CE

Connect the VA-500/500CE with the unit, the color playback picture can be obtained. Either the composite signal or the VHF RF signal can be output.

- VF rotate bracket : BKW-401

The BKW-401 is a rotating housing mechanism for the VF of the Betacam camera. The range of rotation is from the horizontal position (operating condition) to 90°. It also provides the existing front and rear sliding mechanism.

- VTR connector unit : BKW-402

This is used to connect the unit to the BVW-50/50P portable video cassette recorder using the CCZ 26-pin cable. This arrangement enables simultaneous recording using the built-in VTR and external VTR by component signal.

- 5-inch viewfinder : BVF-50/50CE, BVF-55/55CE

Please refer to operation manual for more information on installation.

- Earphone : ME-20B

- Microphone : C-74

- Microphone Holder : CAC-12

- Cradle Suspension : CRS-3P

- Carrying Case : LC-201 (only supplied with BVW-D600P)

- UHF portable tuner attachment kit: BTA-27

- Cassette Tape : BCT-5M / 10M / 20M / 30M
BCT-5G / 10G / 20G / 30G

- Portable Videocassette Recorder : BVW-50/50P

- BVW-50/50P Connection Cable : CCRZ-5, CCZ-2/10

- Cleaning Cassette: BCT-5CLN

- VF Slide Guide for Left Eye
(Sony Part No. A-7612-381-A)

- VF Fog-proof Filter
(Sony Part No. 1-547-341-11)

- Chest Pad
(Sony Part No. A-8262-516-A)

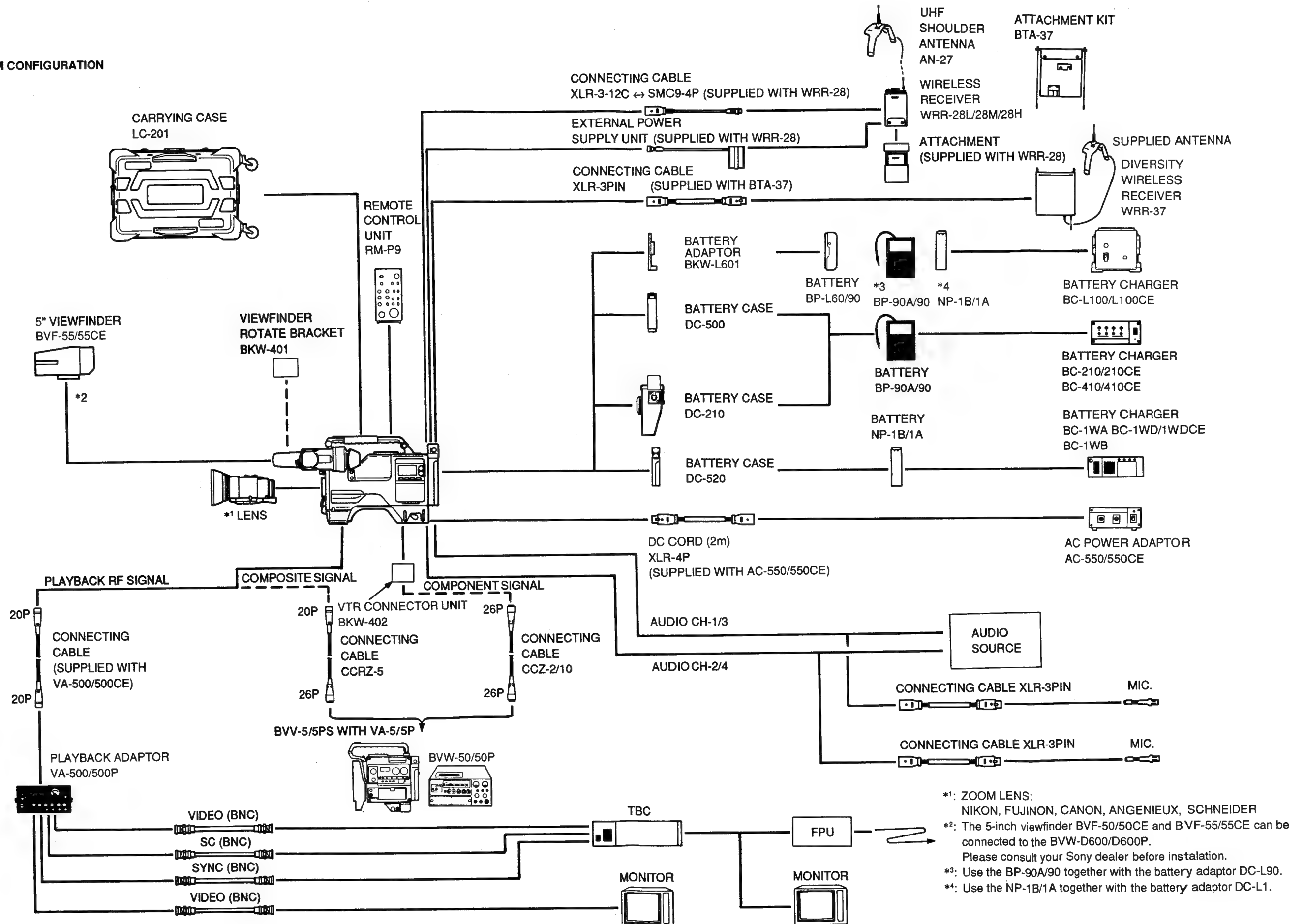
- Lens Assembly for Aged Eyes
(Sony Part No. A-8262-537-A)

- Lens Assembly for Low Power
(Sony Part No. A-8262-538-A)

- Lens Assembly
(standard magnification with special compensation for aberration)
(Sony Part No. A-8267-737-A)

- High performance (3x) Lens Assembly
(Sony Part No. A-8314-798-A)

1-19. SYSTEM CONFIGURATION



BVW-D600 (UC)
BVW-D600P (UC, EK)

1-47

1-47

SECTION 2 PERIODIC CHECK AND MAINTENANCE

2-1. MAINTENANCE TIME TABLE

The replacement time shown in the table below is not the gurantee term of perts. Use this table as guideline for maintenance and inspection. The replacement time of parts varies depending on the operating environment and conditions of the unit.

To maintain the steady performance, it is recommended to clean the tape running sysytem every the following hours as a guide.

- every 50 hours (A) : Cleaning by cleaning tape (Refer to Section 2-4)
- every 200 hours (A) : Perform by cleaning by the following process (Refer to Section 2-4)
 1. Cleaning by cleaning tape (Refer to Section 2-4)
 2. Cleaning by cleaning cloth (Refer to Section 2-4)

ITEM	Part No.	HOURS METER MODE	500 (H)	1,000 (H)	1,500 (H)	2,000 (H)	2,500 (H)	3,000 (H)	3,500 (H)	4,000 (H)	4,500 (H)	5,000 (H)	5,500 (H)
Upper drum	A-6762-418-(UC) A-6762-406-(EK)	A	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Tension regulator band	X-3722-325-	B	-	◆	-	◆	-	◆	-	◆	-	◆	-
Supply side soft brake	X-3722-324-	B	-	◆	-	◆	-	◆	-	◆	-	◆	-
Take-up side soft brake	X-3722-323-	B	-	◆	-	◆	-	◆	-	◆	-	◆	-
Supply side idler	A-8278-249-	B	-	-	-	-	-	◆	-	-	-	-	-
Take-up side idler	A-6740-091-	B	-	◆	-	◆	-	◆	-	◆	-	◆	-
Pinch roller	X-3722-363-	B	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Timing belt	3-722-452-	B	-	-	◆	-	-	◆	-	-	◆	-	-
Slip ring	A-6050-652-	A	-	◆	-	◆	-	◆	-	◆	-	◆	-
Brush	A-6050-648-	A	-	◆	-	◆	-	◆	-	◆	-	◆	-
Lower drum *3	A-6050-673-(UC) A-6050-611-(EK)	B	-	-	◆	-	-	◆	-	-	◆	-	-
Gear	X-3722-306	B	-	◆	-	◆	-	◆	-	◆	-	◆	-
Slantness table (rail)	3-725-214- 3-725-215- 3-725-217- 3-725-218-	B	-	O	-	O	-	◆	-	O	-	O	-
Threading cam gear	A-6737-190- A-6750-231- A-6750-233-	B	-	-	-	-	-	◆	-	-	-	-	-
Sensor on the reel Table	—————	B	-	O	-	O	-	O	-	O	-	O	-

- Threading motor B 1,500H
- Capstan motor B 1,500H
- Full erase head B 1,500H
- CTL head B 1,500H
- A/T head B 1,000H

(NOTE) 1 HOURS METER MODE

A: DRUM RUNNING METER
B: TAPE RUNNING METER
C: OPERATION METER

3 Replacement of the
Head drum ass'y

- 2 ◆: Replacement
O: Cleaning

BVW-D600 (UC)
BVW-D600P (UC, EK)

2-2. HOURS METER

This unit has an hours meter in the DIAGNOSTIC mode. It displays the accumulated time of drum rotating time, tape running time, and VTR turning on time on the display on the side panel.

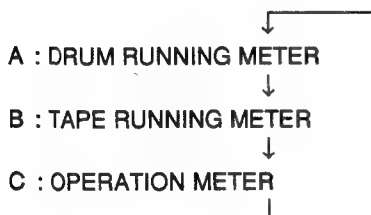
It is recommended to perform the periodic checks and maintenance based on the hours meter.

Hours meter can be displayed by the following procedures described below.

1. Press the DIAGNOSTIC switch on the side panel and put into the DIAGNOSTIC mode.
"DRUM RUNNING METER" is displayed.



2. By pressing the SHIFT button on the side panel, the display rotates in the following sequence.



3. To end the DIAGNOSTIC mode, press the DIAGNOSTIC switch again.

(NOTE) If the TC-48B/48BP board is replaced, be sure to replace the nonvolatile memory (Ref. No. IC515).

2-3. MAINTENANCE AFTER THE REPAIRS

Perform the following maintenance after repair without regarding the machine operating hours.

1. Video heads and stationary heads cleaning.
2. Tape movement area cleaning.

2-4. CLEANING PROCEDURE

[Cleaning by Cleaning Tape]

Tools : • Cleaning Tape : BCT-5CLN or BCT-D12CL (standard products)

Procedures :

1. Inserts the cleaning tape to the unit.
2. Runs the cleaning tape in the playing mode at 5 seconds.
3. Take out the cleaning tape.

(NOTE) Be sure to use the cleaning tape the BCT-5CLN or BCT-D12CL. If the cleaning is performed by other cleaning tape, not the BCT-5CLN or BCT-D12CL, unusual friction or damage of the video head may occur.

[Cleaning by Cleaning Cloth]

Tools : • Cleaning Cloth : 3-184-527-01 (size 150 x 150 mm) or 3-178-770-01 (size 240 x 240 mm)
• Cleaning Fluid : 9-919-573-01

Procedure :

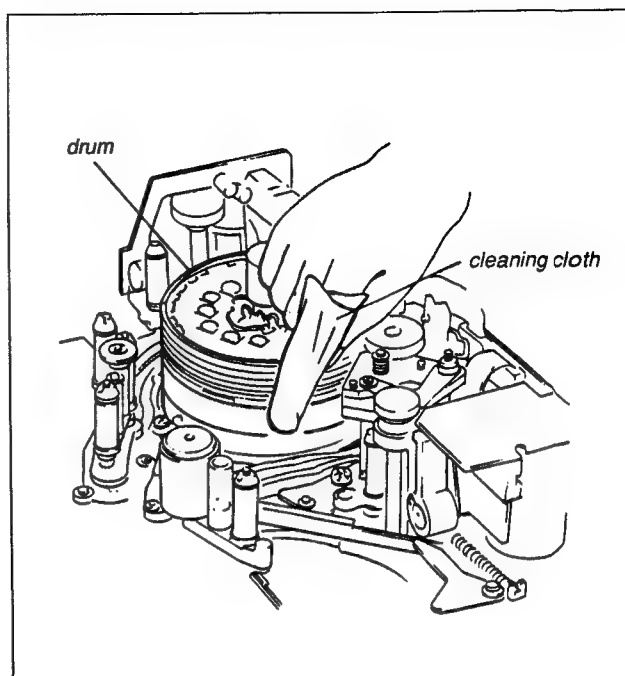
1. Turn the power off.
2. The Cassette-up Compartment can be fully opened. (Refer to Section 3-3).
3. Hold the cleaning cloth moistened with cleaning fluid keeping it from becoming wrinkled.
And perform the cleaning of the following.
The detail of the cleaning method is as shown below.
 - 2-4-1. Video Head
 - 2-4-2. Audio/TC, Audio Confidence Heads
 - 2-4-3. CTL, FE (Full Erase) Heads
 - 2-4-4. Tape Movement Areas
4. After cleaning, wipe it with a dry cleaning cloth two or three times.
5. Return to the Cassette-up Compartment.

(NOTE) • Each block in the mechanical deck consists of a precision parts and is adjusted precisely. Be careful not to damage each part and to apply an excessive force during cleaning.
• Do not touch the greased portions during cleaning. If the grease attach to a cleaning cloth, replace the cleaning cloth by new one. If a cleaning smeared with grease is used, grease may attach to the places where it should not.
• Do not insert a cassette tape before a cleaning fluid completely evaporates after cleaning.

2-4-1. Video Head

Press the cleaning cloth moistened with cleaning fluid and turn the drum slowly with hand.

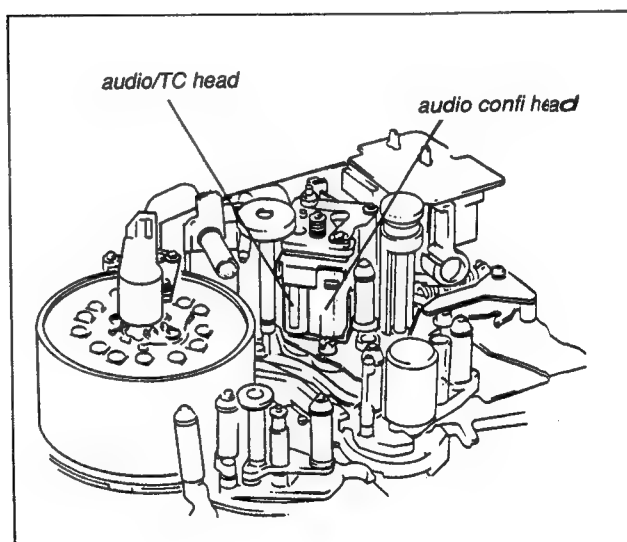
- (NOTE)
- Be sure to clean the head with the power off.
 - Never move the cleaning cloth in the vertical direction on the head tip during cleaning.
 - Do not use a head cleaner stick to clean the rotary heads.



2-4-2. Audio/TC, Audio Confidence Heads

Clean with the cleaning cloth moistened with the cleaning fluid.

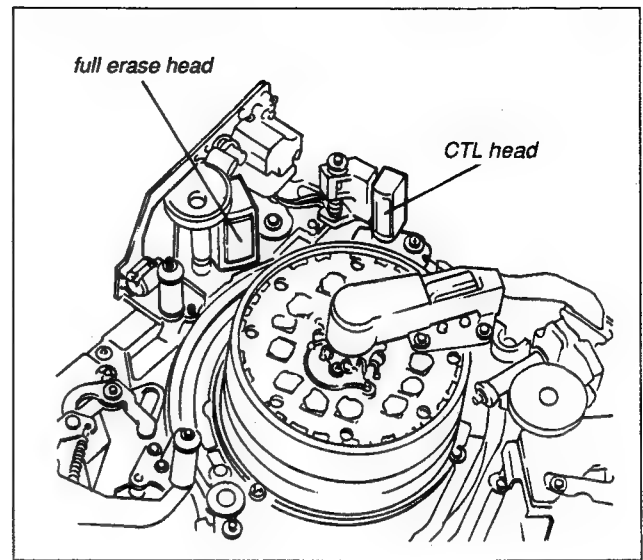
(In case of the cleaning of the Stationary Head, the head cleaner stick can be used instead of the cleaning cloth. Head Cleaner Stick : 3-601-330-01)



2-4-3. CTL, FE (Full Erase) Heads

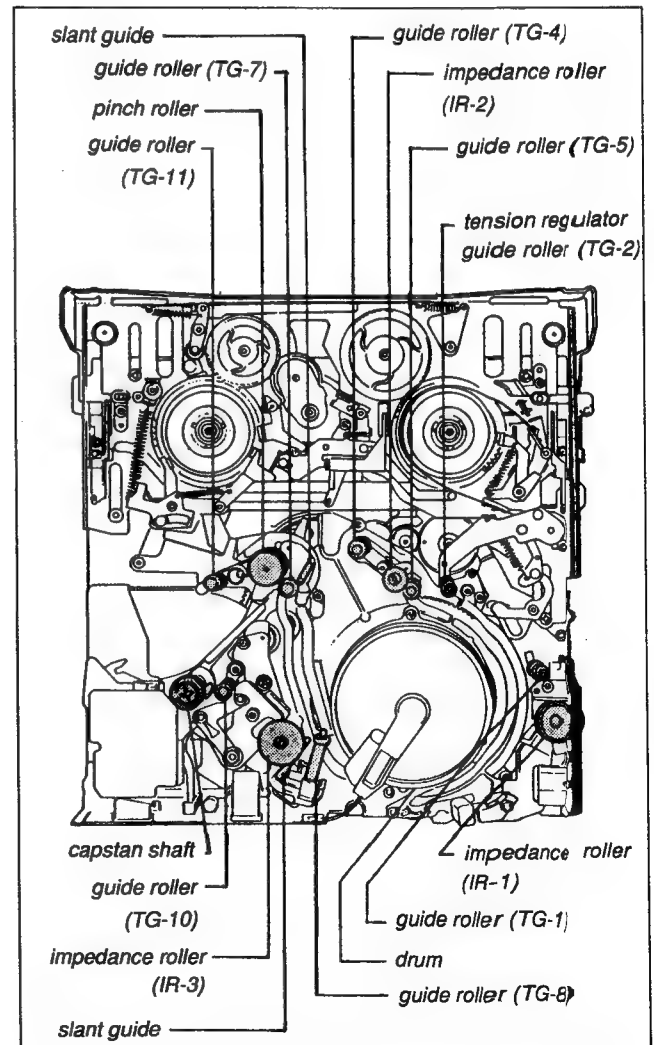
Clean with the cleaning cloth moistened with the cleaning fluid.

(In case of the cleaning of the Stationary Head, the head cleaner stick can be used instead of the cleaning cloth. Head Cleaner Stick : 3-601-330-01)



2-4-4. Tape Movement Areas

Clean with the cleaning cloth moistened with the cleaning fluid; tape guides, drum, capstan and the pinch roller as shown in the figure.



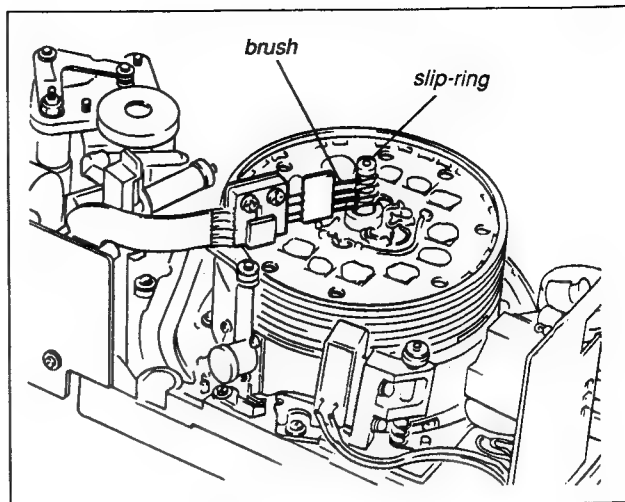
2-4-5. Slip-rings and Brushes

The Head Drum Assembly Slip-rings and Brushes do not require periodic cleaning. However, if dust adheres to the Slip-rings or Brushes, clean them as follows:

1. Clean the Slip-ring or Brush with a Soft brush which has short hairs. If this brush can not be obtained, use a Blower brush and Cotton Swab.
2. Cleaning fluid is not especially necessary. However, if it is difficult to remove persistent debris, use Freon as a cleaning agent.

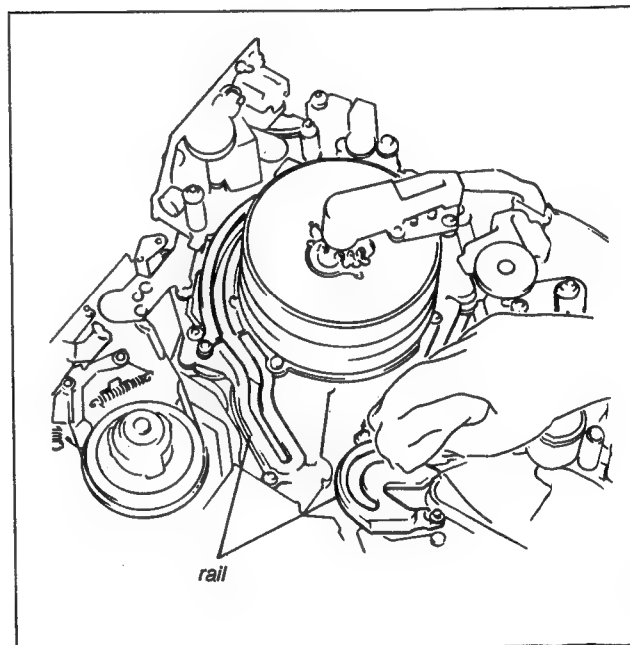
(NOTE) • Do not use alcohol as a cleaning fluid. If the Slip-ring and the Brushes are cleaned with alcohol, the surface tends to attract material which may increase the resistance at the contact area.

- Do not use conductive grease.



2-4-6. Rail

Clean with the cloth moistend with the alcohol.



2-4-7. Viewfinder Lens

By extracting the VF tube sub assy, lens and MC protector can be easily cleaned. And also dust on the CRT surface or mirror can be easily cleaned off.

1. Turn the hold ring to the left and extract the VF tube sub assy.
2. Detach the eyecup.
3. Remove the MC protector together with the filter holder.
4. Clean the lens and MC protector with a commercially available camera lens cleaner. Blow off dust with a blower carefully so as not to flaw the mirror.
5. After the cleaning is completed, install by reversing the preceding steps. Align red lines of the VF tube and VF tube sub assy when inserting, and turn the hold ring to the right until it locks.

- (NOTE)
- Do not use any type of solvent, such as alcohol, benzine or thinner to remove stains.
 - Be sure to attach the eyecup to the VF, or the MC protector may come off.
 - To protect the viewfinder lens from drops, put the MC protector in the filter holder and attach the eyecup securely.
 - To prevent mist on a lens, an optional fog-proof filter (FP filter, Sony parts No. 1-547-341-11) is prepared. Use in place of the MC protector.
 - The following parts are available as optional accessories.

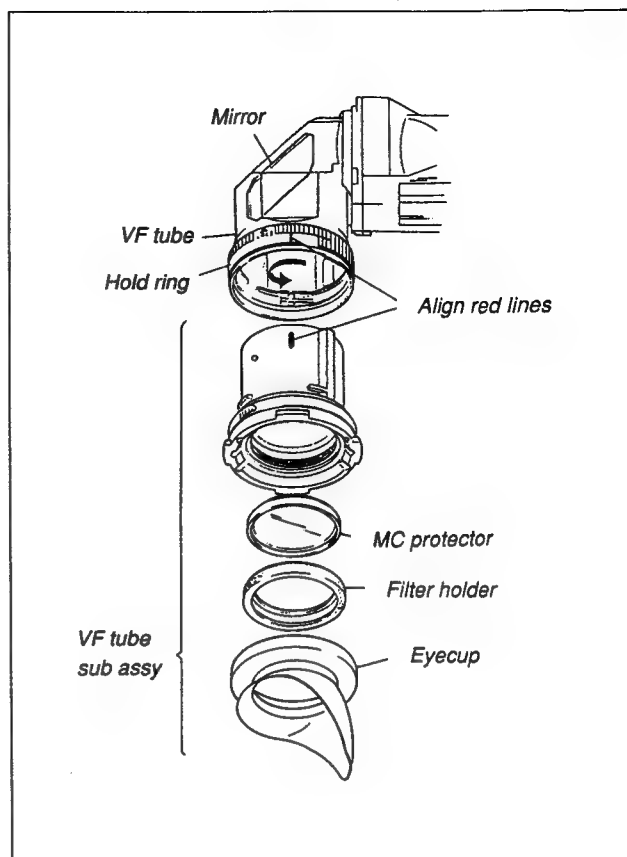
Eyepiece Assembly for aged eyes

(Sony Part No. A-8262-537-A)

Eyepiece Assembly for low power

(Sony Part No. A-8262-538-A)

They can be replaced in place of the VF tube sub assembly, if necessary.



2-5. AFTER USED AT SEASIDE OR DUSTY AREAS

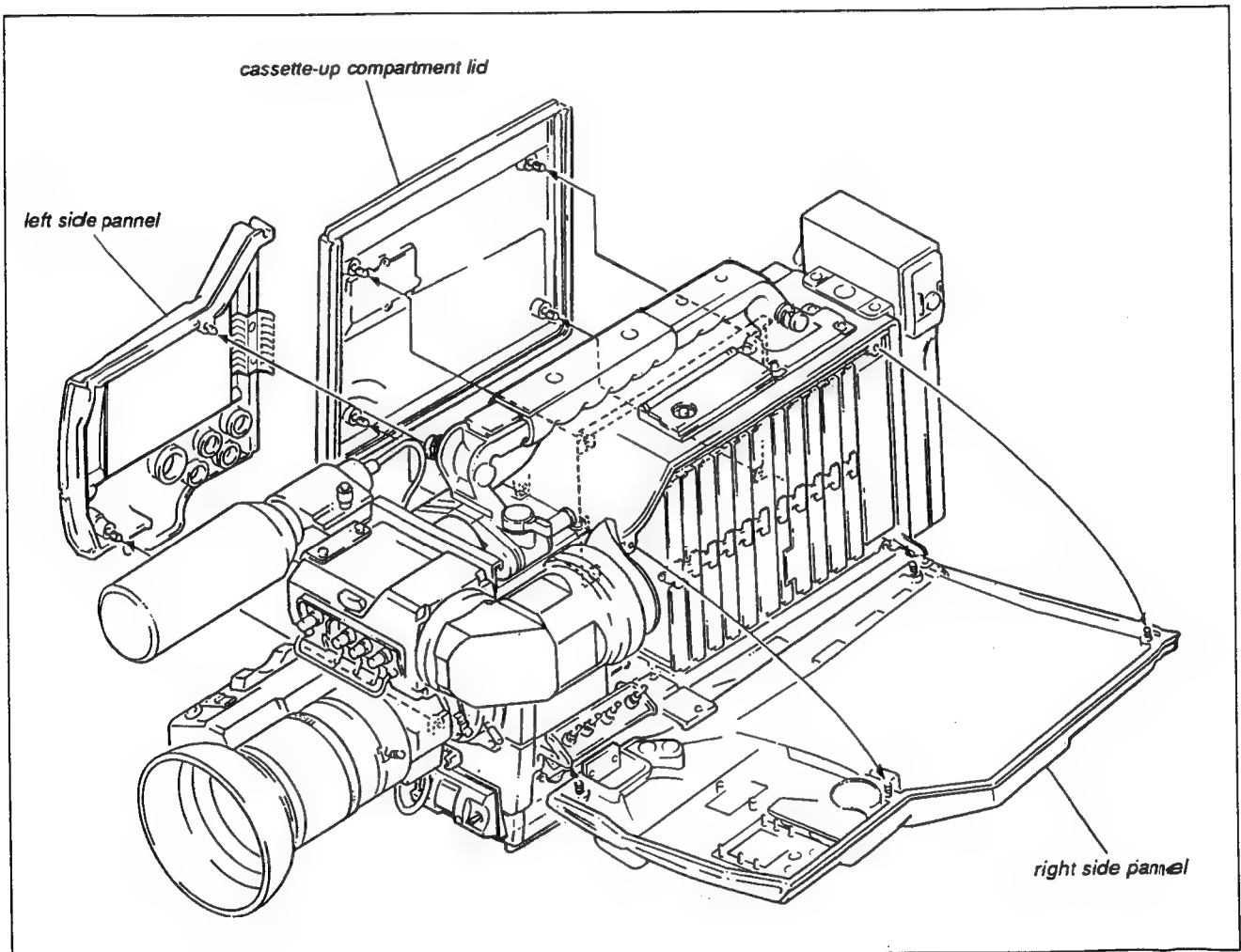
It is recommended to check the following items after the news gathering at seaside or dust areas.

1. Clean off sand and other dust in the unit with a cleaning cloth moistened with the cleaning fluid, or blow off with an air-brush carefully.
2. Clean the video head and stationary heads with a cleaning cloth moistened with the cleaning fluid.
3. Clean the tape movement areas (the drum surface, tape guides, capstan shaft and the pinch roller) with a cleaning cloth moistened with the cleaning fluid.
4. Clean the upper of chassis of the unit.
5. Clean the surface of the reel tables contacting with the brake shoes.
6. Rotate by hand and move the tape guides, pulley, capstan and the pinch roller, and check that any abnormal noise sounds or not. If there sounds a noise, replace the part immediately.
7. After the news gathering at seaside, remove the printed circuit board.
Clean the printed circuit board with a cleaning cloth moistened with the cleaning fluid after blow off sand on the completely. Then clean the soldering side in the same manners.
8. Clean the connector on the connector panel completely.
9. Perform the operation check and be sure that the machine operates normally.

SECTION 3 SERVICE INFORMATION

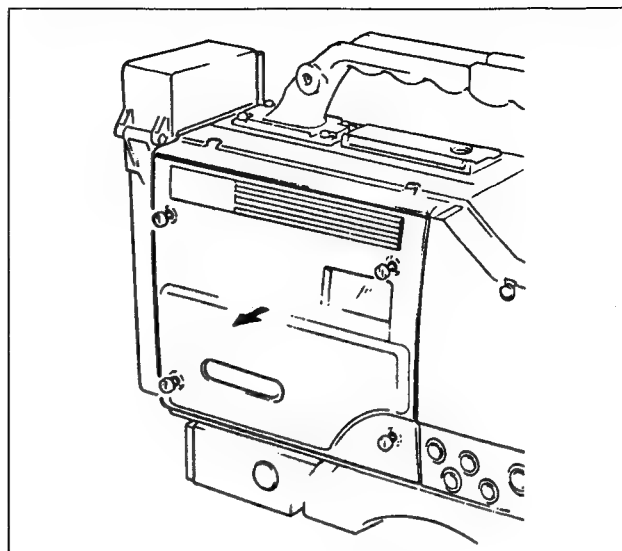
3-1. REMOVAL OF THE CABINET

Loosen the fixing screws shown in the figure, and remove the panels.

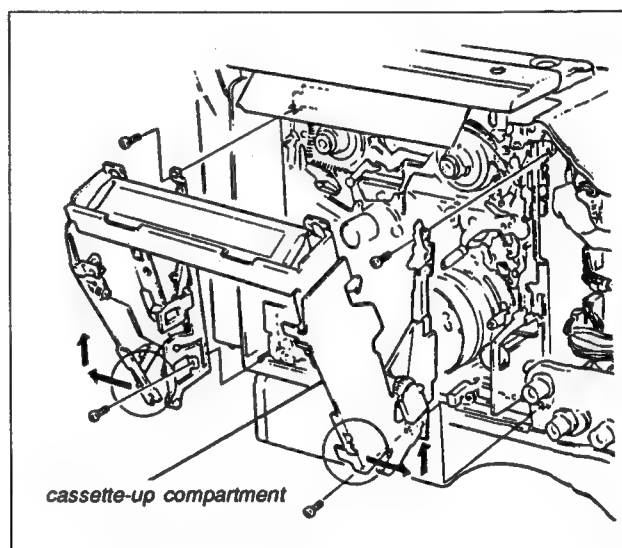


3-2. REMOVAL OF THE CASSETTE-UP COMPARTMENT

1. Loosen the four fixing screws and remove the Cassette-up Compartment Lid.



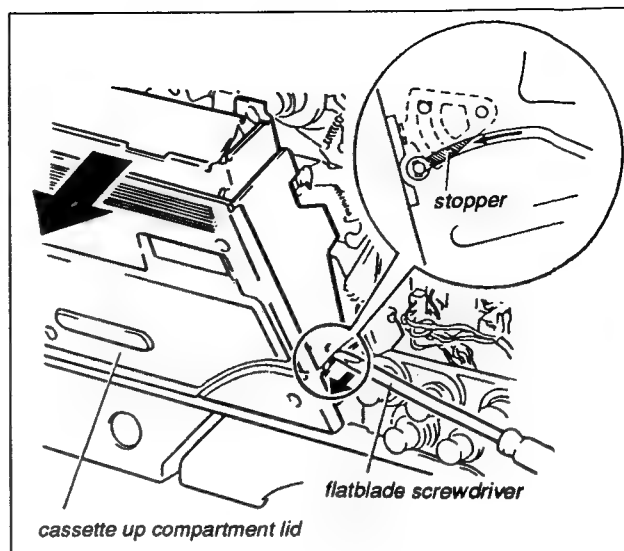
2. Remove the four fixing screws shown in the figure. Then move the Cassette-up Compartment in the direction of the arrows and remove it.



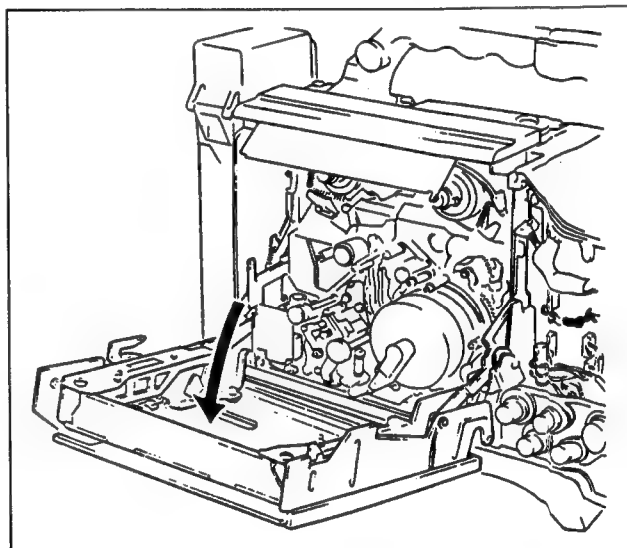
3-3. HOW TO FULLY OPEN THE CASSETTE-UP COMPARTMENT

The Cassette-up Compartment can be fully opened for tape movement area cleaning and heads cleaning.

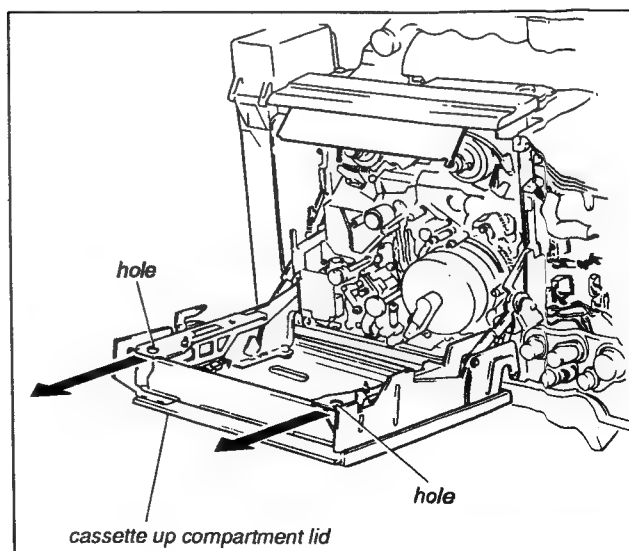
1. Put the unit into EJECT mode.
2. Release the stopper by inserting a flatblade screwdriver into the grooves on the left and right sides of the Cassette-up Compartment shown in the figure while pulling its cover lightly in the direction of the arrow.



3. Then, the Cassette-up Compartment is fully opened.



4. To return to the original position, pull the two holes shown in the figure in the direction of the arrow and close the lid of the Cassette-up Compartment. (A click sound will be heard).
Check that the Cassette-up Compartment has been returned to its correct position.

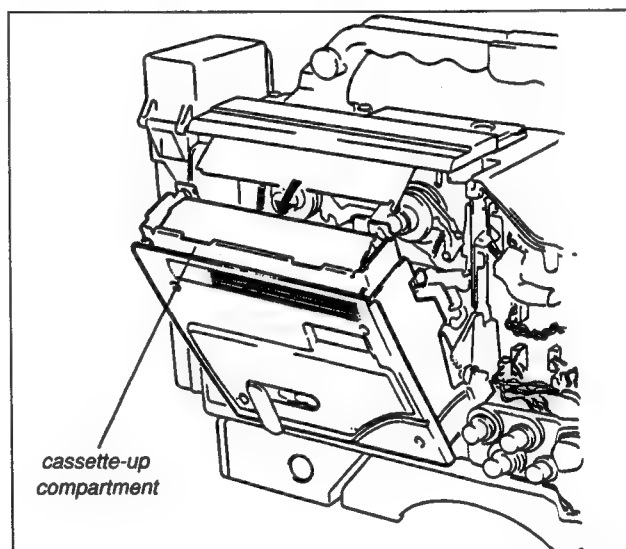
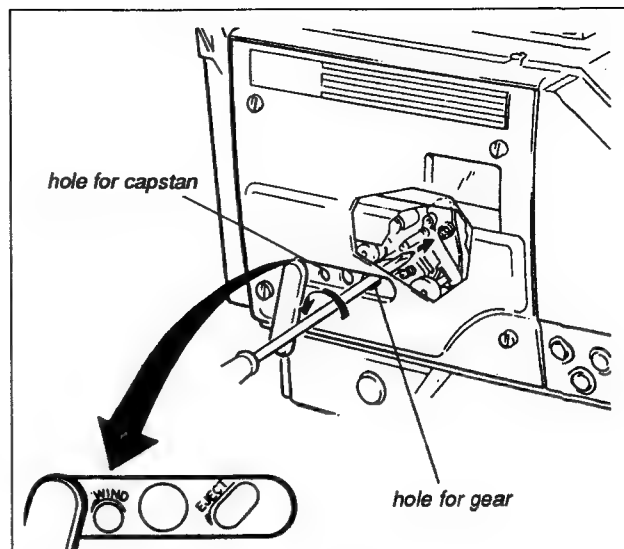


3-4. WHEN THE TAPE SLACKED IN THE UNIT, HOW TO REMOVE THE CASSETTE TAPE

1. Turn OFF the POWER switch.
2. Open the cover on the Cassette-up Compartment Lid.
3. While holding the Cassette-up Compartment by hand, insert the phillips type screwdriver into the hole for the gear shown in the figure and turn the gear about four times in the EJECT direction.
4. After detecting that the lock is released by hand, insert the screwdriver into the hole for capstan shown in the figure, and turn the Capstan in the WIND direction until the supply side Reel Table begin to rotate.
5. When the tape is wound into the cassette, pull out the screwdriver from the unit and release the hand from the Cassette-up Compartment.
6. Then, the cassette tape can be removed.

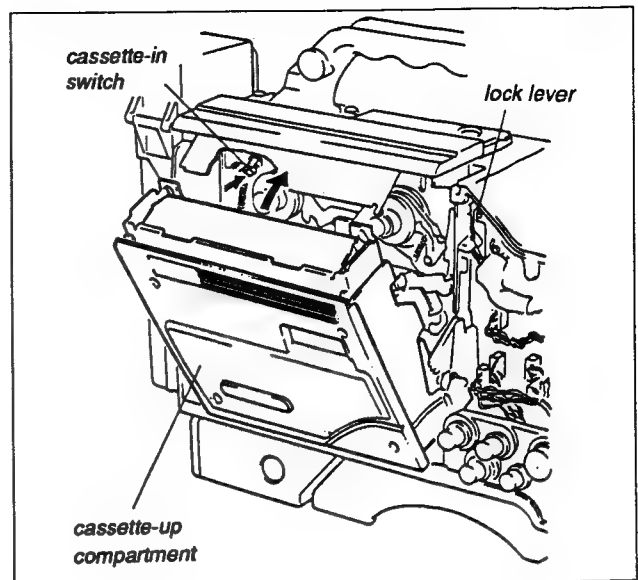
(NOTE) After remove the cassette tape, be sure to turn ON the POWER switch before close the Cassette-up Compartment.

If not, the Cassette-up Compartment is not locked, because the lock lever is not located in the normal position.



3-5. OPERATION OF THE UNIT WITHOUT THE CASSETTE TAPE

1. Put the unit into EJECT mode.
2. Open the Cassette-up Compartment fully. (Refer to Sec. 3-3)
3. While pressing the Cassette-in switch, press the stopper of the lock lever with a pencil lead or similar object and lock the stopper.
4. After the movement of the Reel Chassis is completed, release the Cassette-in switch.
5. Press the desired function button.



3-6. EXTENSION BOARD

The plug-in type printed circuit boards listed below can be serviced by using two Extension Boards, EX-148 and EX-406. Simply insert the Extension Board into the amplifier chassis and connect the circuit board to be serviced to the end of the Extension Board.

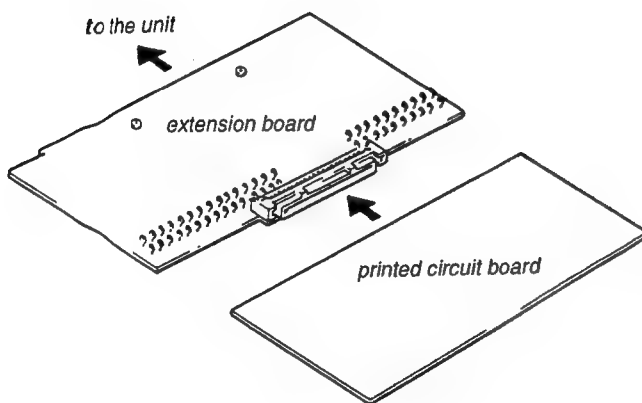
(NOTE) Be sure to turn OFF the POWER before inserting or removing the Extension Board or printed circuit boards.

To be extended with EX-148

AT-75
VA-128
VP-24/24P
VDA-11/11P
AFM-6/6P
AU-97/97P
SV-97A/97AP
SY-117C/117CP

To be extended with EX-406

IF-393/393P
AD-83
DA-66



3-7. NOTES FOR ADJUSTMENT OF THE PRINTED CIRCUIT BOARDS

- (1) Power is supplied irrespective of POWER switch is turned OFF, because of back up of the time code data.
When disconnecting the FL-57 flexible printed circuit board connected to the TC-48B/48BP board, turn OFF the POWER switch, remove the battery and disconnect the cable from the DC IN connector.
- (2) If the protect circuit of the DC-DC converter CD-89 is activated because of the short circuit of power circuit, turn OFF the POWER switch once, and then turn ON the POWER switch.

3-8. SERVICE OF THE PRINTED CIRCUIT BOARD

- **TC-48B/48BP Board**

If the TC-48B/48BP board is replaced, be sure to mount the nonvolatile memory (Ref. No. IC515) that is used in the unit before.

- **MB-440/440P Board**

When replacing the MB-440/440P board, remove the all plug in printed circuit board, and remove the upper and lower PC board guides.

- **BI-64(R)/64(G)/64(B) Boards**

A BI board on which the CCD is mounted had better not be removed. When removing it, the CCD is sometimes broken by the static electricity. If the CCD is broken, the whole CCD unit should be replaced.

- **DP-196/197 Boards**

Any parts mounted on the DP-196/197 board are not allowed to be repaired or replaced.

If either of the DP-196/197 boards is faulty, the whole DP ASSY should be replaced.

3-9. DISCONNECT AND CONNECT OF THE FLEXIBLE PRINTED CIRCUIT BOARD

1. Turn the POWER OFF, remove the battery and disconnect the DC IN connector.
2. Disconnect and install the flexible printed circuit board as shown in the figure.

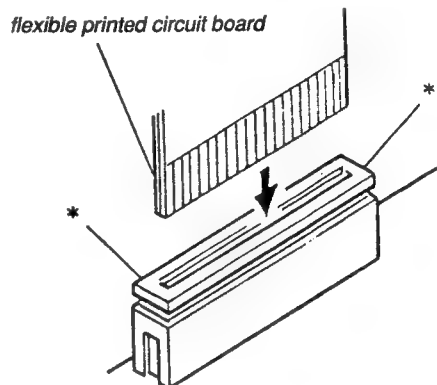
<Straight Type>

Disconnecting procedure

Pull up the * marked portions of connector, and pull out the flexible printed circuit board from the connector.

Installing procedure

Install the flexible printed circuit board as far as it will go until the line indicated on the flexible printed board, and push down the * marked portions of connector.



<Angle Type>

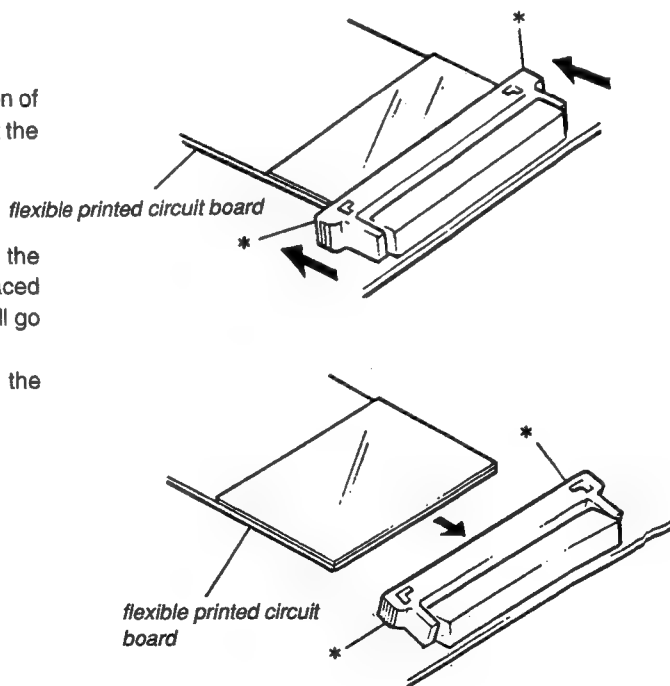
Disconnecting procedure

Slide the * marked portions of connector in the direction of the arrows, pull up the connector, and then disconnect the flexible printed circuit board from the connector.

Installing procedure

Pull up the * marked portions of the connector, insert the flexible printed circuit board on its contacting side is faced to the printed circuit board, and insert it as far as it will go until the line indicated on the flexible board.

Push down the * marked portions, then slide it in the direction of the arrow to lock.



- (NOTE) 1. Not install the flexible printed circuit board on a slant.
2. Not short the terminal of the flexible printed circuit board.

3-10. CAUTION FOR ELECTRICAL PART REPLACEMENT

3-10-1. Chip Parts Replacement Procedure

Tools: Soldering iron of 20W (Use a temperature controller, if possible, which can control the iron temperature to $270 \pm 10^\circ\text{C}$)
Desoldering metal braid (Solder Wick or equivalent)
Solder (0.6 mm dia.)
Tweezers

Soldering Conditions: Tip temperature; $270 \pm 10^\circ\text{C}$ within the 2 seconds

1. To remove a resistor or capacitor, place the tip of a soldering iron on chip parts to heat the parts, and then move it horizontally for removal while being desoldered. For removal of a diode or transistor, heat the one side, with two pins, of chip parts at the same time, set the parts up when desoldered, and remove the two pins. And then, remove the pin on another side.
2. Absorb solder by using a desoldering metal braid to smooth the land surface of board after removal.
3. Confirm by visual check that no pattern of the removed chip parts is peeled off and no adjacent parts is damaged or bridged.
4. Perform a thin pretinning on the pattern.
5. Place new chip parts on the pattern to solder its both sides.

(NOTE) • The chip part removed should not be used again.
• When mounting the new chip part, should not shift so that it not short.
• Use the soldering iron vertically as much as possible.
• When mounting the new chip part, heat it from pattern side. Never contact the tip of the soldering iron to the part.



* When removing the IC, it is recommended that the following TECHNO DESIGN soldering iron be used.

TOP-482 for SOP

TOP-483 for QFP

TOP-480 temperature controller
for TOP-482,483

3-11. SPARE PARTS

1. The shaded  and  marked components are critical to safety.
Replace only with the same components as specified.
2. Replacement parts supplied from the Sony Parts Center will sometimes have a different shape and outside view from the parts which are used in the unit. This is due to "accommodating improved parts and/or engineering changes" or "standardization of genuine parts".
 - This manual's exploded views and electrical spare parts lists indicate the part numbers of "the present standardized genuine parts".
 - Regarding engineering part changes by our engineering department, refer to Sony service bulletins and service manual supplements.
3. The parts marked with "s" in the SP column of the exploded views and electrical spare parts lists are normally stocked for replacement purposes. The parts marked with "o" in the SP column are not normally required for routine service work. Orders for parts marked with "o" will be processed, but allow for additional delivery time.

3-12. REMOVAL OF THE MECHANICAL DECK BLOCK

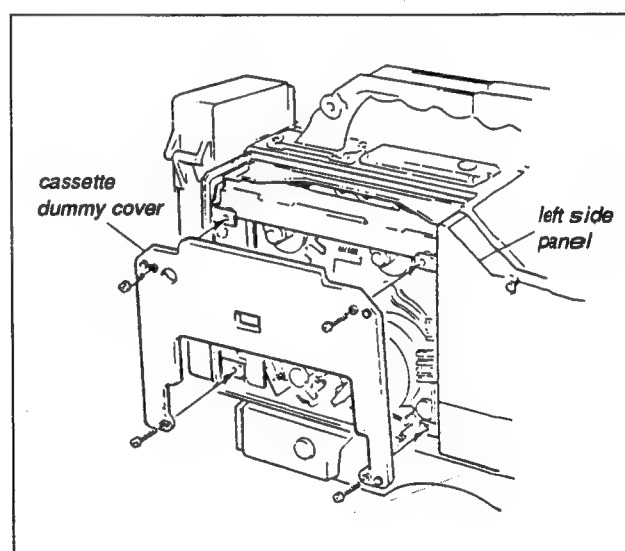
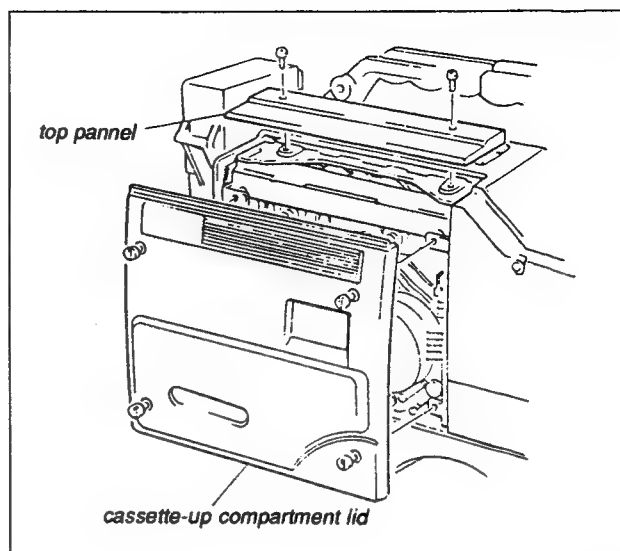
1. Put the unit into the threading end mode.
2. Remove the Top Panel.
3. Remove the Cassette-up Compartment Lid and install the Cassette Dummy Cover which is prepared for service.
4. Remove the Left Side Panel.
5. Remove the four screws which secure the mechanical deck block to the unit by using the hexagon bit (J-6326-120-A).
6. Remove the mechanical deck block from the unit while removing the connectors below on the mother board.

Drum : CN41 and CN42

FE-4 board : CN43

TB-5 board : CN44

(NOTE) When installing the mechanical deck block, perform the tape run check or alignment in Section 6.

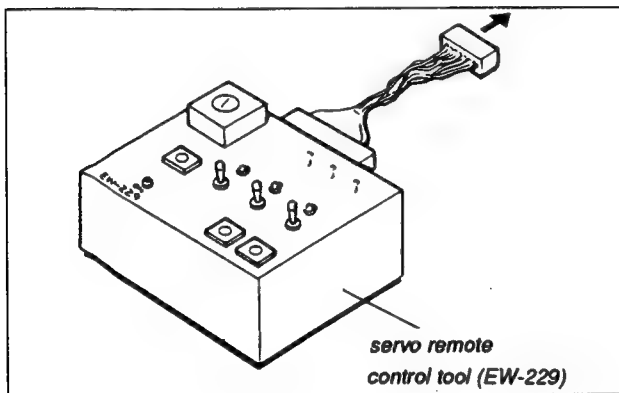


3-13. USE OF THE SERVO REMOTE CONTROL TOOL

For servo system alignment and mechanical alignment, it is recommended to use the SERVO REMOTE CONTROL TOOL (EW-229).

(1) Connection

1. Connect the connector (14P, female) of the supplied harness to the tool.
2. Connect the other side of the connector of the harness to CN2/SV-97A/97AP board of the VTR.



(2) Function of switches and test points

The desired mode can be obtained by push switches and rotary switch on the function control panel of this tool.

- TRCON switch

After the rotary switch is set to the "F" position, turn ON this switch. Then LED lights, tracking control is possible by pressing the "+" button or the "-" button.

When turned OFF, return the unit to the just tracking mode. The memory is cleared by disconnecting the connector of the tool from the CN2/SV-97A/97AP board.

- SW POSITION switch

After the rotary switch is set to the "F" position, turn ON this switch. Then LED lights, the switching position is shifted by pressing the "+" button or the "-" button.

- REC SERVO switch

Extend the SV-97A/97AP board by using the EX-148 extension board. After the rotary switch is set to the "F" position, open or short the TP11/EX-148 board. Then the following mode is obtained.

- After the TP11/EX-148 board is opened, turn ON this switch. Then LED lights, the capstan servo circuit is put into the REC SERVO mode.

- After the TP11/EX-148 board is shorted with GND, turn ON this switch. Then LED lights, the unit is put into the back space editing alignment mode.

- REV button

The unit is put into REV mode by pressing this button.

Press the STOP button on the VTR, the unit is put into the STOP mode.

- SW PULSE test terminal

The switching pulse signal is appeared at this test terminal.

- CTL test terminal

The CTL signal is appeared at this test terminal.

- Rotary switch

The mode described in the following table is obtained by setting the rotary switch to "0" through "F" positions. However the rotary switch is set to the same position, the different mode can be obtained by shorting between TP11/EX-148 board and GND. (In this mode, extract the SV-97A/97AP board, and extend it with EX-148 extension board.)

When the rotary switch is set to the specified positions, it is necessary to mute the slack detection circuit.

The slack detection circuit can be muted by turning ON the S1/SY-117C/117CP board.

Rotary Switch	TP11/ EX-148	Mode	For use
0	OPEN	Drum rotating. Capstan rotating. The CH-1 head of luminance or chrominance is selected.	Recording/playback is possible with the CH-1 head only of luminance or chrominance. This mode is used for check and adjustment to the CH-1 head for luminance or chrominance.
	Short with GND	Phase servo circuit of the drum is turned to OFF.	Check the servo system circuit.
1	OPEN	Drum rotating. Capstan rotating. The CH-2 head of luminance or chrominance is selected.	Recording/playback is possible with the CH-2 head only of luminance or chrominance. This mode is used for check and adjustment to the CH-2 head for luminance or chrominance.
	Short with GND	_____	_____
2	OPEN	Drum rotating. Capstan rotating. The CH-3 head of luminance or chrominance is selected.	Recording/playback is possible with the CH-3 head only of luminance or chrominance. This mode is used for check and adjustment to the CH-3 head for luminance or chrominance.
	Short with GND	_____	_____
3	OPEN	Drum rotating. Capstan rotating. The CH-4 head of luminance or chrominance is selected.	Recording/playback is possible with the CH-4 head only of luminance or chrominance. This mode is used for check and adjustment to the CH-4 head for luminance or chrominance.
	Short with GND	The capstan rotates at 1/6 times normal speed.	Check the CTL signal output at 1/6 times normal speed. (Before the check, mute the slack detection circuit.)
4	OPEN	Drum rotating is stopped. The switching pulse selects each channel. (Mute the slack detection circuit.)	
	Short with GND	The capstan rotates at three times normal speed.	Check the servo system circuit.

Rotary Switch	TP11/ EX-148	Mode	For use
5	OPEN	Drum rotating is stopped. The switching pulse selects the CH-1 head of luminance or chrominance. (Mute the slack detection circuit.)	
	Short with GND	_____	_____
6	OPEN	Drum rotating is stopped. The switching pulse selects the CH-2 head of luminance or chrominance. (Mute the slack detection circuit.)	
	Short with GND	_____	_____
7	OPEN	Drum rotating is stopped. The switching pulse selects the CH-3 head of luminance or chrominance. (Mute the slack detection circuit.)	
	Short with GND	_____	_____
8	OPEN	Drum rotating is stopped. The switching pulse selects the CH-4 head of luminance or chrominance. (Mute the slack detection circuit.)	
	Short with GND	_____	_____
9	OPEN	Capstan rotating is stopped in the PAUSE mode.	Tape path alignment. (Before the alignment, mute the slack detection circuit.)
	Short with GND	_____	_____

Rotary Switch	TP11/ EX-148	Mode	For use
A	OPEN	_____	_____
	Short with GND	_____	_____
B	OPEN	_____	_____
	Short with GND	_____	_____
C	OPEN	_____	_____
	Short with GND	_____	_____
D	OPEN	The overlap is increased of 3H in each entrance and exit side.	Check the quantity of overlap.
	Short with GND	_____	_____
E	OPEN	The limit of the RF alarm detection is increased.	RF alarm alignment.
	Short with GND	_____	_____
F	OPEN	Normal mode.	_____
	Short with GND	Normal mode.	_____

3-14. MAINTENANCE TOOL

Part Number	Description	For use
J-6001-820-A	DRUM ECCENTRICITY GAUGE (3)	Upper drum eccentricity adjustment
J-6001-830-A	DRUM ECCENTRICITY GAUGE (2)	Upper drum eccentricity adjustment
J-6026-100-A	RESOLUTION CHART	Measurement of Pick-up Tube Response
J-6026-130-B	GRAY SCALE CHART	Measurement of Pick-up Tube Response
J-6029-140-B	PATTERN BOX, PTB-500	Camera System Alignment
J-6035-070-A	EXTRACTION TOOL	Removal of EPROM IC
J-6080-003-C	FWD BACK TENSION MEASUREMENT CASSETTE	FWD torque adjustment
J-6086-570-A	PLATE, PARALELL	Audio head zenith adjustment
J-6152-450-A	WIRE CLEARANCE CHECK GAUGE	Clearance check
J-6321-500-A	TAPE GUIDE ADJUSTMENT DRIVER	Tape path adjustment
J-6321-880-A	CASSETTE DUMMY COVER	Mechanical deck adjustment
J-6325-110-A	TORQUE DRIVER BIT (FOR M1.4)	Parts replacement
J-6325-360-A	FLATNESS CHECK TOOL	Assembling the frame
J-6325-380-A	TORQUE DRIVER BIT (FOR M2)	Parts replacement
J-6325-400-A	TORQUE DRIVER (FOR 3kg)	Parts replacement
J-6325-530-A	DRUM ECCENTRICITY GAUGE (6)	Upper drum eccentricity adjustment
J-6326-120-A	HEXAGON BIT	Removal of the mechanical deck block
J-6332-290-A	SERVO REMOTE CONTROL TOOL	Mechanical deck and servo system adjustment
J-6336-070-A	SETUP ATTENUATOR TOOL	Video System Adjustment
J-6335-710-A	REC CURRENT ADJUSTMENT TOOL	REC current adjustment
J-6392-500-A	VIDEO SIGNAL INPUT BOARD	Video system adjustment
J-6335-740-A	EXTENSION HARNESS	Mechanical deck adjustment
7-732-050-20	TENSION SCALE (50g FULL SCALE)	Tension adjustment
7-723-902-00	INSPECTION MIRROR	Video Tracking Adjustment
8-960-096-01	ALIGNMENT TAPE, CR2-1B (UC)	TAPE Run Alignment
8-960-096-41	ALIGNMENT TAPE, CR5-1B (UC)	Audio/Video System Adjustment
8-960-097-44	ALIGNMENT TAPE, CR5-2A (UC)	Video System Adjustment
8-960-097-45	ALIGNMENT TAPE, CR8-1A (UC)	Audio System Adjustment, TAPE Run Alignment
8-960-096-51	ALIGNMENT TAPE, CR2-1BPS (EK)	TAPE Run Adjustment
8-960-098-45	ALIGNMENT TAPE, CR8-1APS (EK)	Audio System Adjustment, TAPE Run Alignment
8-960-096-86	ALIGNMENT TAPE, CR8-1BPS (EK)	Audio System Adjustment, TAPE Run Alignment
8-960-098-44	ALIGNMENT TAPE, CR5-2APS (EK)	Video System Adjustment
8-960-096-91	ALIGNMENT TAPE, CR5-1BPS (EK)	Audio/Video System Adjustment
9-911-053-00	THICKNESS GAUGE	Clearance Check

3-15. PRECAUTIONS ON TIGHTENING THE SCREWS

(1) The Fixing Screws to the Chassis

This unit is compact and lightweight, so many M1.4 x 2.5 screws (1.4mm dia.) and M2 x 5 and M2 x 8 screws (2mm dia.) are employed. A magne-diecast chassis is employed.

Pay careful attention to the tightening torque when tightening the screws. Stronger torque may damage the chassis screws. The torque screwdriver and bits below are provided.

Torque driver	J-6325-400-A
Bit for M1.4	J-6325-110-A
Bit for M2	J-6325-380-A

Screw M1.4 torque: $0.09 \pm 0.01 \text{ N}\cdot\text{m}$ $\{0.9 \pm 0.1 \text{ kg}\cdot\text{cm}\}$

Screw M2 torque: $0.3 \pm 0.05 \text{ N}\cdot\text{m}$ $\{3.0 \pm 0.5 \text{ kg}\cdot\text{cm}\}$

The above torque driver can be used for both screws M1.4 and M2.

If you damage the chassis screws when tightening screw M1.4, use the following screw:

M1.7 x 3 (2-641-348-02)

or

M1.4 x 5 (3-729-013-71)

To distinguish the above screw from screw M1.4, mark the screw top in red. Apply the locking compound at the same time.

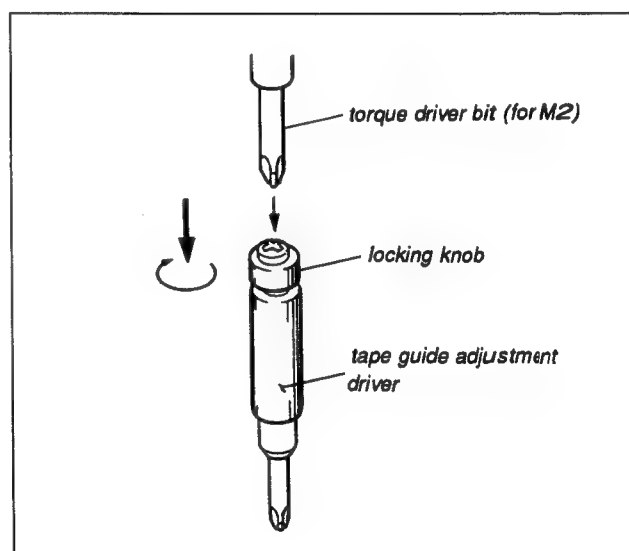
(2) The Locking Screw of the Tape Guide Upper Flange

When the height adjustment of the tape guide is performed in the Tape Run Alignment, use the tape guide adjustment driver (J-6321-500-A) prepared for the maintenance tool.

After the height adjustment of the tape guide is completed, tighten the locking screw of the tape guide upper flange with the torque driver by the following procedures.

Torque Driver	J-6325-400-A
Torque Driver Bit (For M2)	J-6325-380-A
Tightening Torque	$0.09 \pm 0.01 \text{ N}\cdot\text{m}$ $\{0.9 \pm 0.1 \text{ kg}\cdot\text{cm}\}$

- Set the torque driver bit (for M2) on the torque driver.
- Set the torque driver on the screw at the top of the locking knob of the tape guide adjustment driver.
- Push down the torque driver and turn it clockwise.



3-16. INSTALLATION OF THE REEL CHASSIS

- When removing or installing the Reel Chassis, remove the Mechanical Deck Block from the unit. (Refer to Sec. 3-12. Removal of the Mechanical Deck Block.) The following is the procedure for installation of the Reel Chassis.

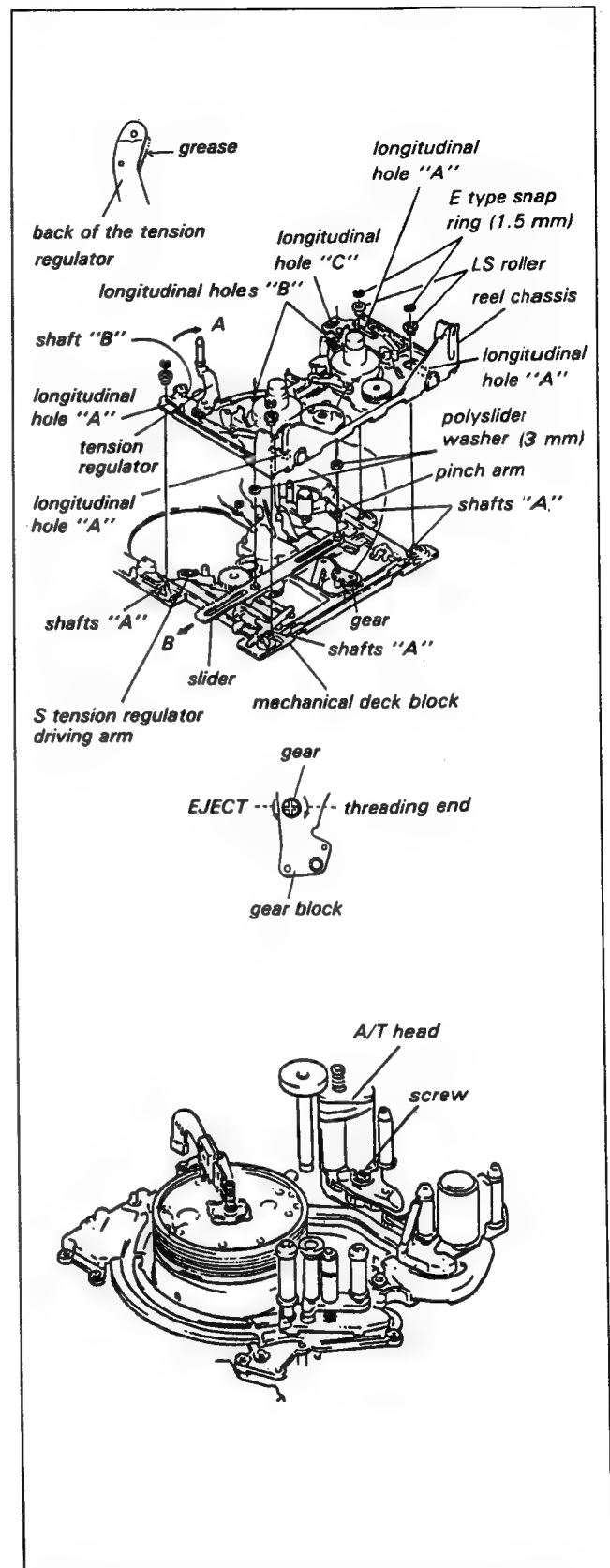
Tool: Sony grease

Sony oil

Mode: EJECT

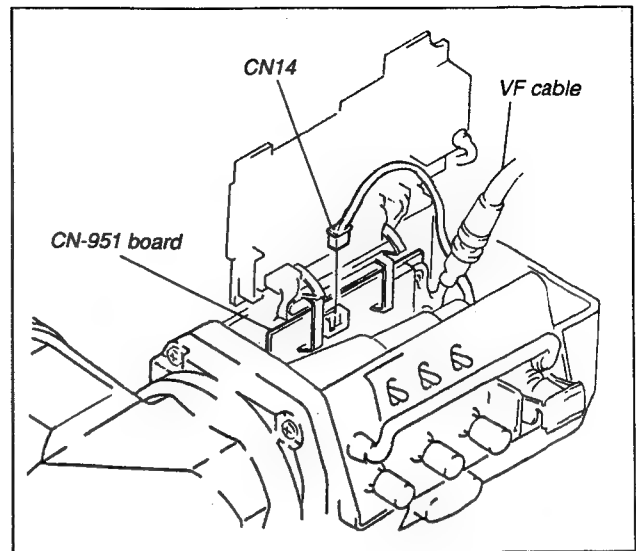
Installation procedure:

- (1) Smear Sony grease on the back of the Tension Regulator of the Reel Chassis Assembly as shown in the figure.
- (2) Gently push the Tension Regulator Arm in the direction of the arrow A.
- (3) Apply a 1/4 drop of Sony oil on each of the four shafts "A" of the Mechanical Deck Block.
- (4) Move the slider in the direction of the arrow B fully by hand.
- (5) Insert 3mm diameter polyslider washers (0.5mm thick) (3-701-439-21) onto the two shaft of the slider.
- (6) Insert the Reel Chassis in the direction shown in the figure so that the gear is not contact with the reel chassis.
 - (i) Insert the four shafts "A" of the Mechanical Deck Block into the four longitudinal holes "A" of Reel Chassis.
 - (ii) Insert the two longitudinal holes "B" onto the two shafts of the Reel Chassis.
 - (iii) Insert the longitudinal hole "C" of the Reel Chassis onto the Pinch Arm Roller.
 - (iv) Insert the shaft "B" of the Reel Chassis into the longitudinal hole of the S Tension Regulator Driving Arm.
- (7) Insert the LS Roller (3-723-007) onto the four shafts "A" of the Mechanical Deck Block as shown in the figure. Fasten with the E type stop ring (1.5mm).
- (8) Turn the screw on the front of the A/T Head by the screwdriver, and repeat threading and unthreading two or three times and check that they can be done smoothly.

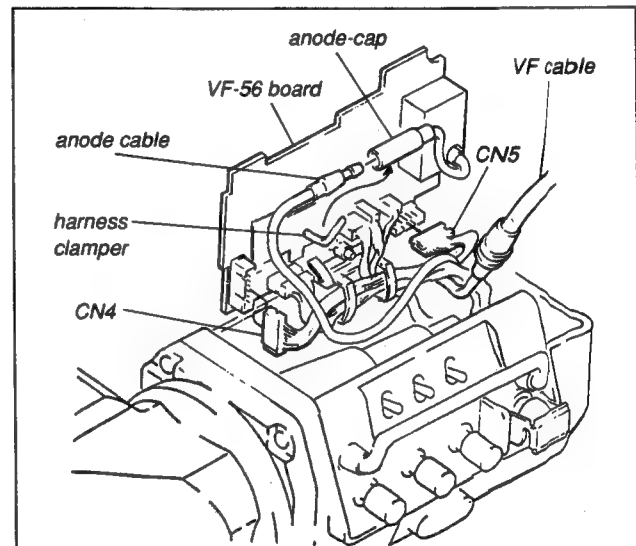


3-17. HOW TO ARRANGE THE VF HARNESS

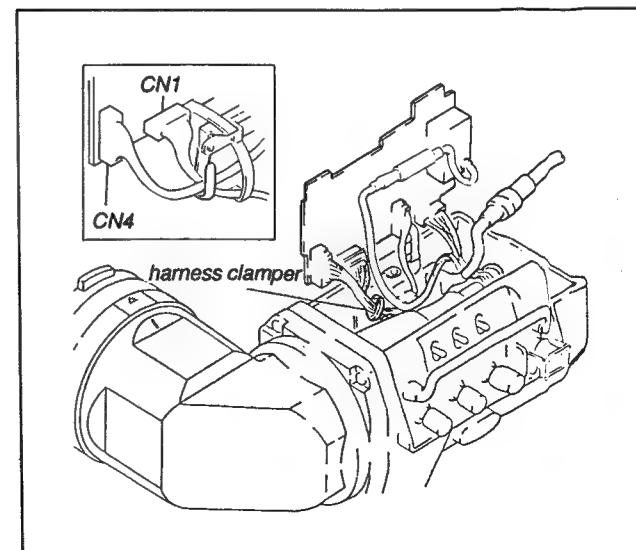
1. Connect the harness of the LP-75/76 Board to CN14 of the CN-951 Board.
 - Arrange the harness around the back of the VF cable as shown in the figure.



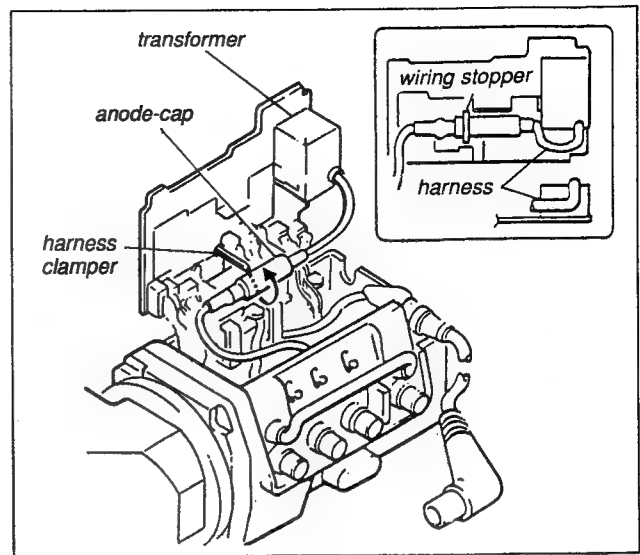
2. Connect the harness of the CRT to CN4 and CN5 of the VF-56 Board.
 - Arrange the harness around the back of the VF cable as shown in the figure.
3. Insert the anode cable into the anode-cap of the VF-56 Board until it locks.



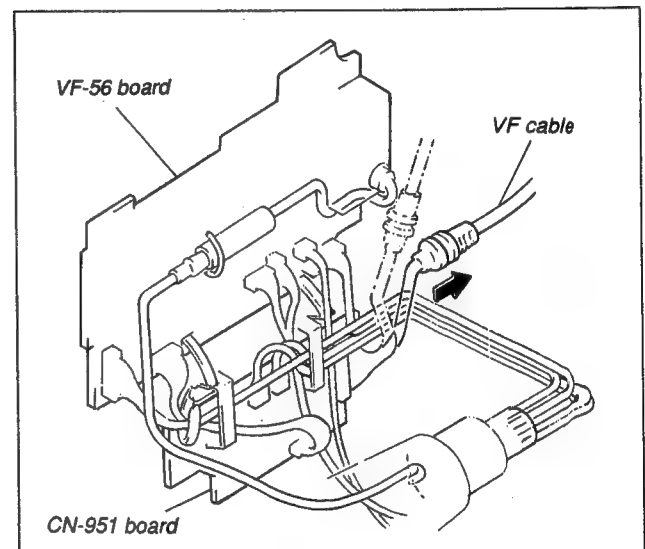
4. Clamp the harness of CN1 and CN4 with a harness clamber.



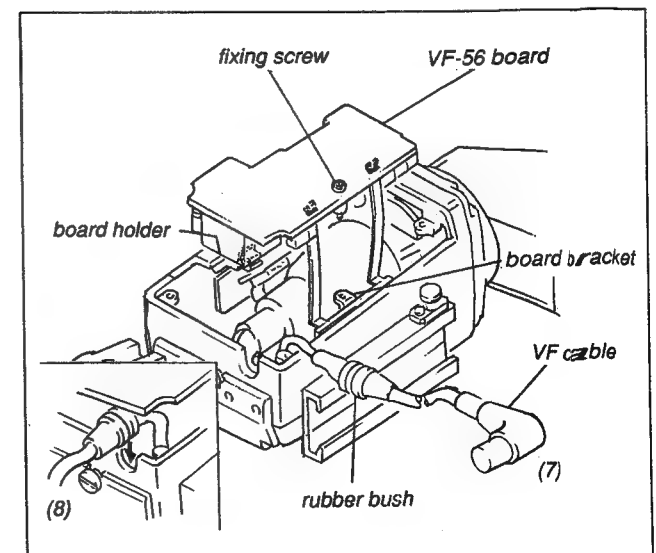
5. Clamp the anode-cap at the position shown in the figure with the harness clumper of the VF-56 Board, and arrange the harness around the side of the Transformer.



6. Check that the harness has been arranged as shown in the figure. Pull the harness of the CRT in the direction of the arrow with the VF cable.

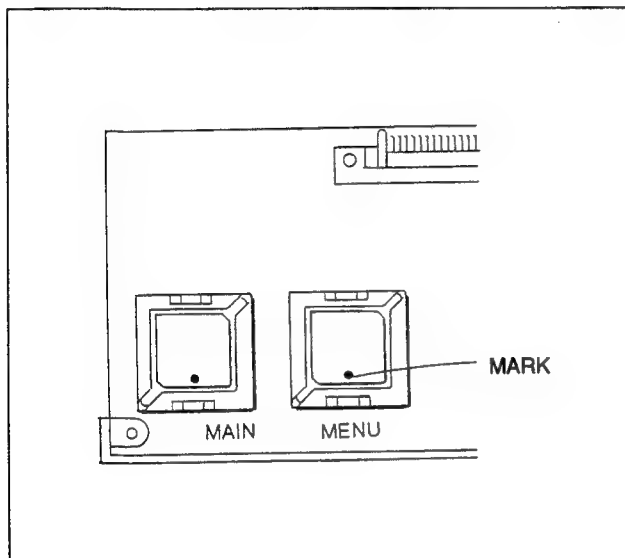


7. Insert the VF-56 Board into the Board holder positioning the VF cable as shown in the figure.
8. Adjust the rubber bush of the VF cable to the notch of the VF and insert, and close the VF-56 Board.
9. Fix the VF-56 Board onto the Board brackets with the fixing screw.



3-18. NOTE IN REPLACING EPROM IC

When removing an EPROM IC (IC16 : MAIN, or IC33 : MENU) on the AT-75 board, it is recommended to use an extraction tool for PLCC socket (Sony Part No. J-6035-070-A). In mounting, pay attention to a mark of IC and do not misplace the MAIN and MENU EPROMs each other.



SECTION 4 REPLACEMENT OF THE MAJOR PARTS

PRECAUTIONS WHEN REPLACING PARTS

1. The mode of the unit when replacing parts is described in the Parts Replacement. The following is the description of the modes.

- **EJECT:** In this mode, the Pinch Roller, Tension Regulator Arm, T Base, and S Base have all completely returned to the reel table side. This condition can be set by turning the screw shown in the figure counterclockwise.

- **Threading end:**
In this mode the Pinch Roller is placed in front of the Capstan Shaft, the T Base and S Base are in the positions of the T Support Bracket and S Support Bracket, and the Tension Regulator Arm is completely open. This condition can be set by turning the screw shown in the figure clockwise.

2. Replace parts with the VTR installed onto the unit, unless otherwise specified. At that time, open the Cassette-up Compartment fully. (Refer to Section 3-3).

3. The polyslider washers used to fix parts should not be used again once they have been removed. Use a new one after replacement.

When installing a polyslider washer to the shaft, push the polyslider washer until the space between it and the part is about 0.1 to 0.2mm.

1.2mm diameter polyslider washer:

3-559-408-11

1.5mm diameter polyslider washer:

3-321-813-01

4. When tightening screws, be sure to keep the tightening torque. The torque driver and bits are provided.

J-6325-400-A Torque driver (for 0.3N·m)

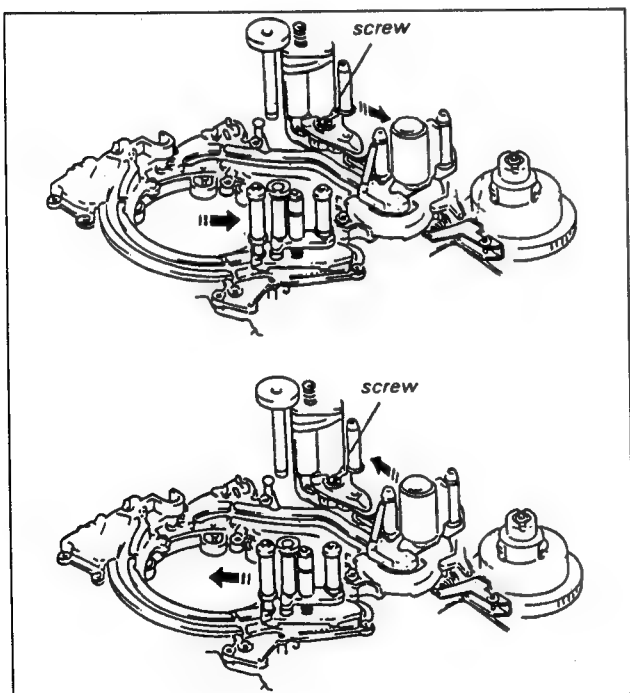
J-6325-110-A Torque driver bit (for M1.4)

J-6325-380-A Torque driver bit (for M2)

Tightening torque

1.4mm dia.screw: $0.09 \pm 0.01 \text{ N}\cdot\text{m}$ ($0.9 \pm 0.1 \text{ kg}\cdot\text{cm}$)

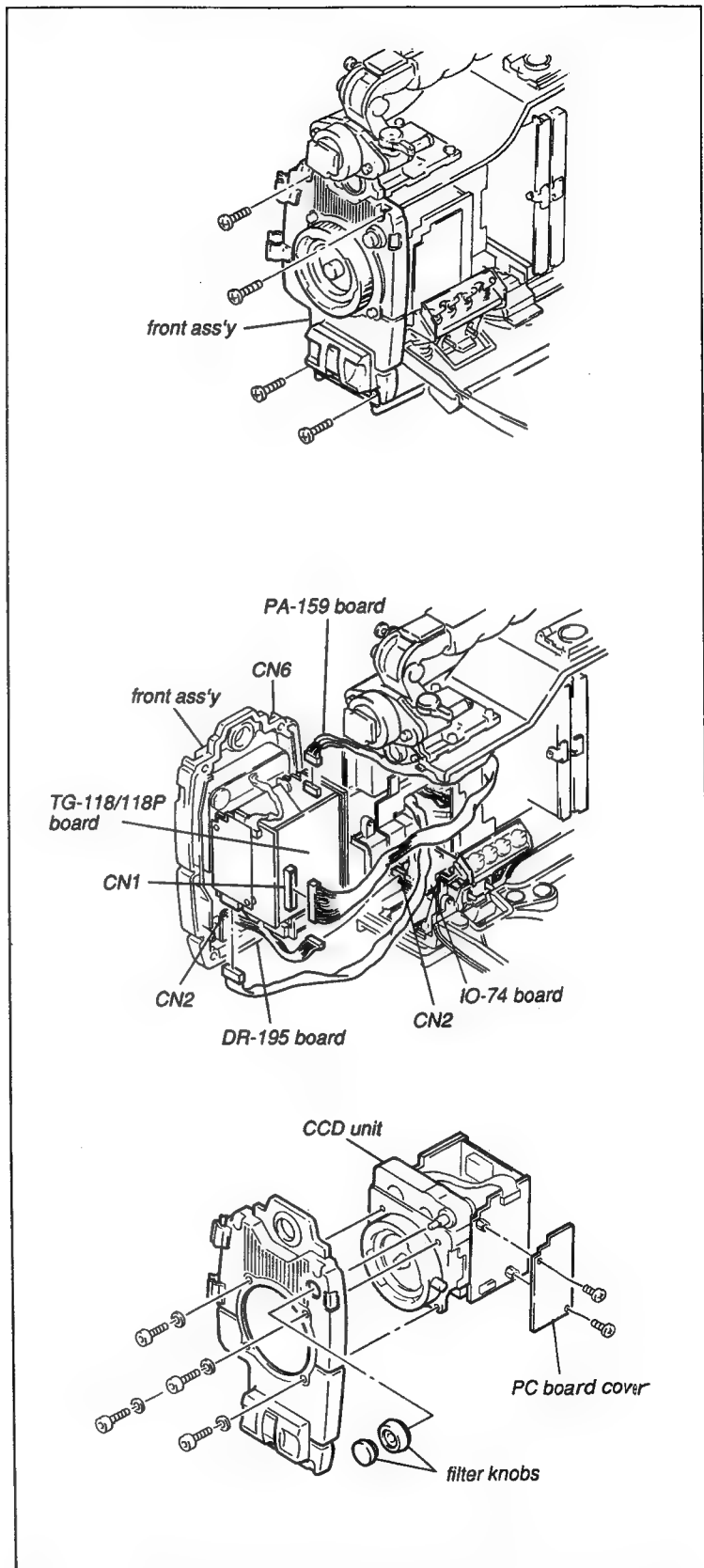
2mm dia.screw: $0.3 \pm 0.05 \text{ N}\cdot\text{m}$ ($3.0 \pm 0.5 \text{ kg}\cdot\text{cm}$)



4-1. REPLACEMENT OF THE CCD UNIT

Replacement procedure:

- (1) Remove the viewfinder.
- (2) Remove the four screws fixing the Front Assembly to the unit.
- (3) Remove the Front Assembly from the unit and disconnect the following connectors.
 - CN2/DR-195 Board
 - CN1/TG-118/118P Board
 - CN6/PA-159 Board
 - CN2/IO-74 Board
- (4) Remove the four screws and filter knobs and remove the CCD unit from the front panel.
- (5) Remove the two screws and remove the PC Board Cover.

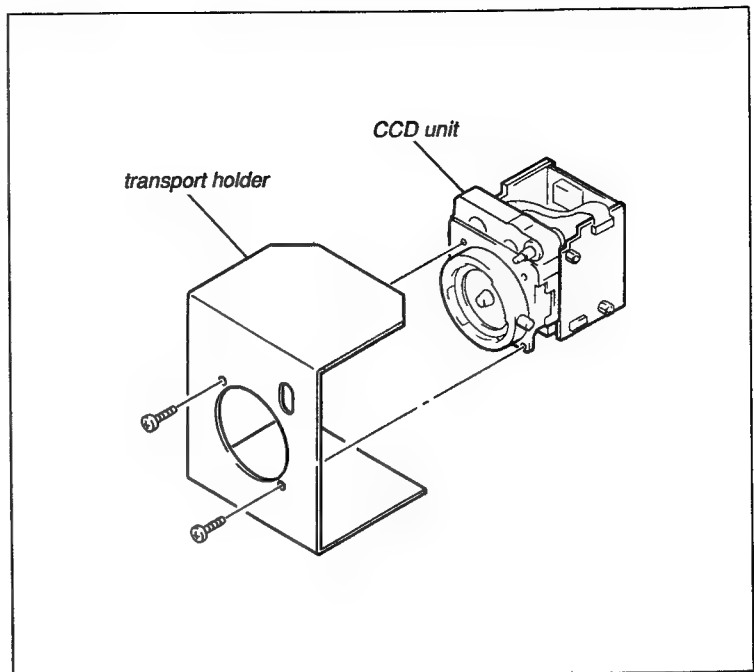


- (6) Remove the transport holder from a replacement CCD unit supplied from Sony parts center.

NOTE:

When transporting the CCD unit that was removed from the unit, the transport holder should be reused.

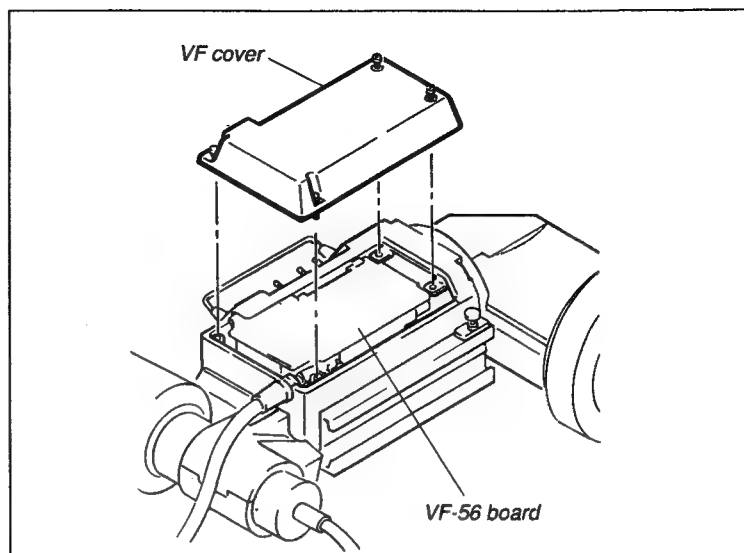
- (7) Install a new CCD unit in the reverse order of removal.
- (8) After replacement, be sure to perform adjustments referring to Section "7-1-2. Connection and Initial Setting".



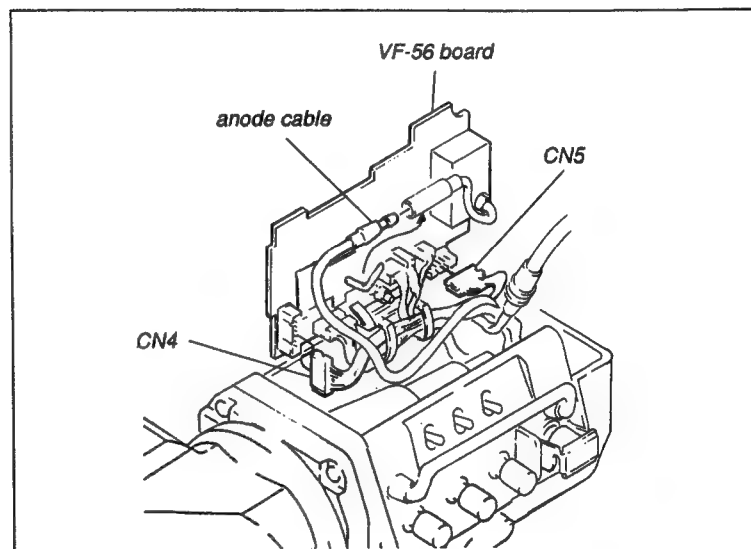
4-2. REPLACEMENT OF THE VIEWFINDER CRT

Replacement procedure:

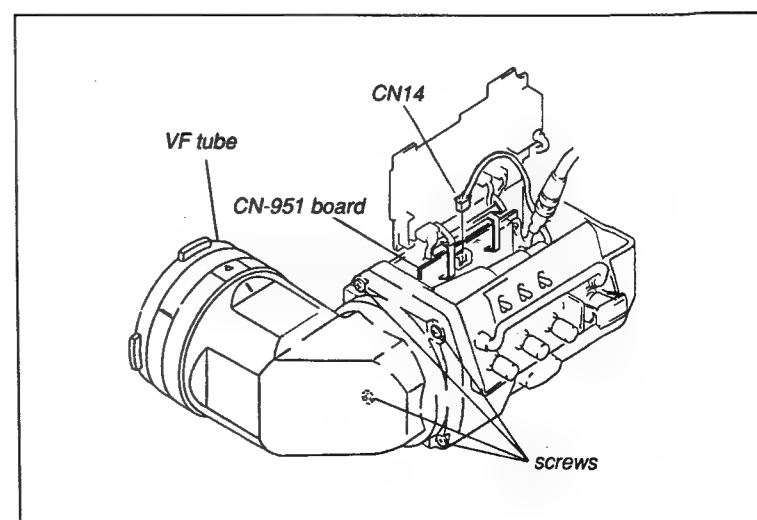
- (1) Loosen the four screws, and remove the VF cover.
- (2) Loosen the screw fixing the VF-56 Board, and open the Board while moving it in the direction of the arrow.



- (3) Disconnect the connectors CN4 and CN5 and the anode cable from the VF-56 Board.



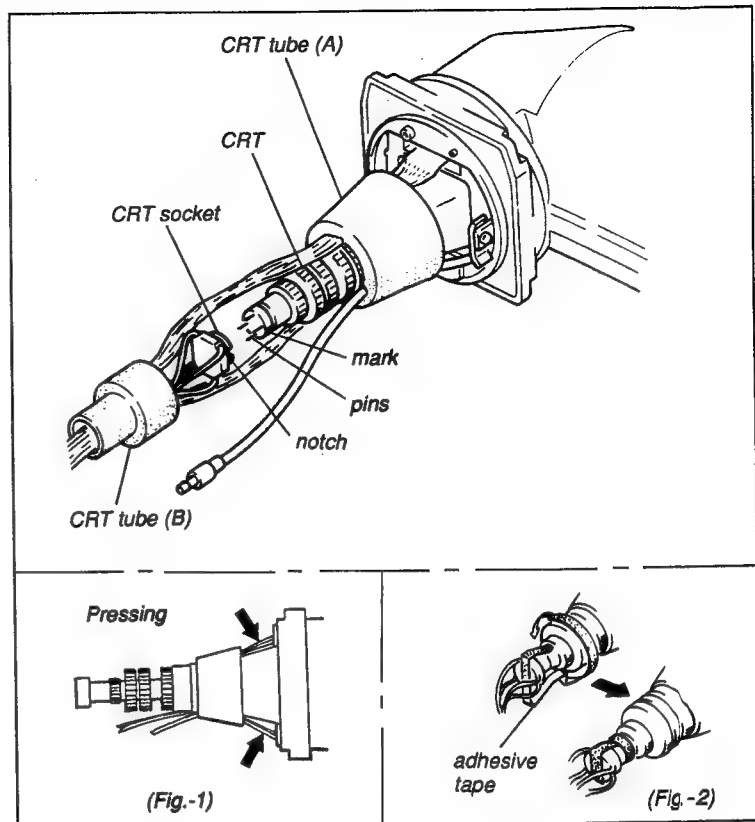
- (4) Disconnect the connector CN14 from the CN-951 Board.
- (5) Loosen the four screws shown in the figure, and remove the VF Tube from the VF unit.



- (6) Remove the CRT tubes (A) and (B), and remove the CRT socket from the CRT.

Note in Assembling

- Before covering the CRT with the CRT tube (A), arrange the harnesses from the CRT so that they are not laid on one another. And cover it while pressing the harnesses lightly against the CRT so that they do not bulge out. (Fig.-1)
- In connecting the CRT socket, match a mark of CRT with a notch of CRT socket and insert carefully so as not to bend pins of CRT. (Fig.-2)
- After insertion, bind adhesive tape around the socket part and CRT neck part. (Fig.-2)

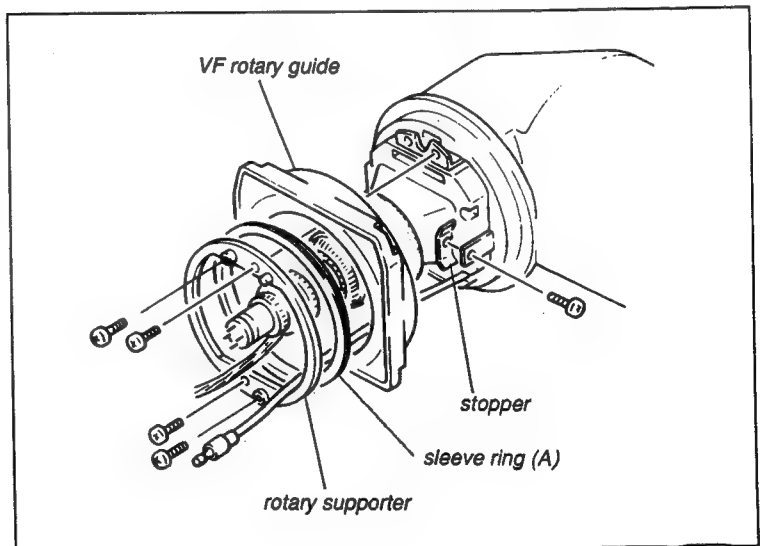


- (7) Remove the screw and the stopper.
Remove the four screws, and remove the Rotary Support, Sleeve Ring (A) and VF Rotary Guide.

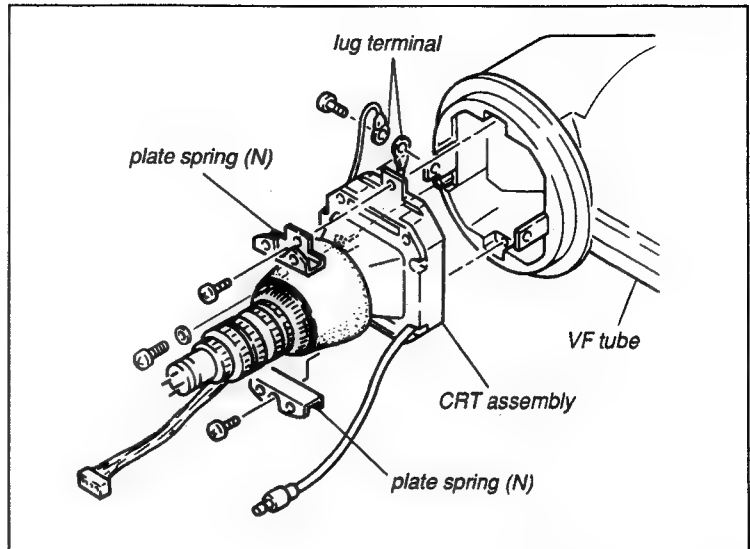
Note in Assembling

- When tightening screws securing the Rotary Support, be sure to keep the tightening torque.

Tightening torque: 0.15 N·m
{1.5 kg·cm}



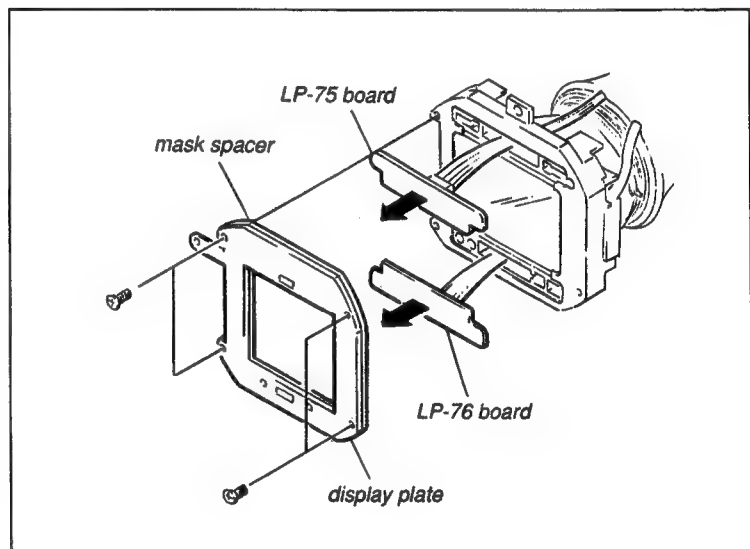
- (8) Remove each screw fixing the lug terminal and Display Plate.
- (9) Remove the two Plate Springs (N), and remove the CRT assembly from the VF tube.



- (10) Remove the four screws, and remove the mask spacer with Display Plate from the CRT.
- (11) Remove the LP-75/76 Board in the direction of the arrow.
- (12) Replace the CRT.
- (13) After replacing, install in the reverse order of removal.

Note In Assembling

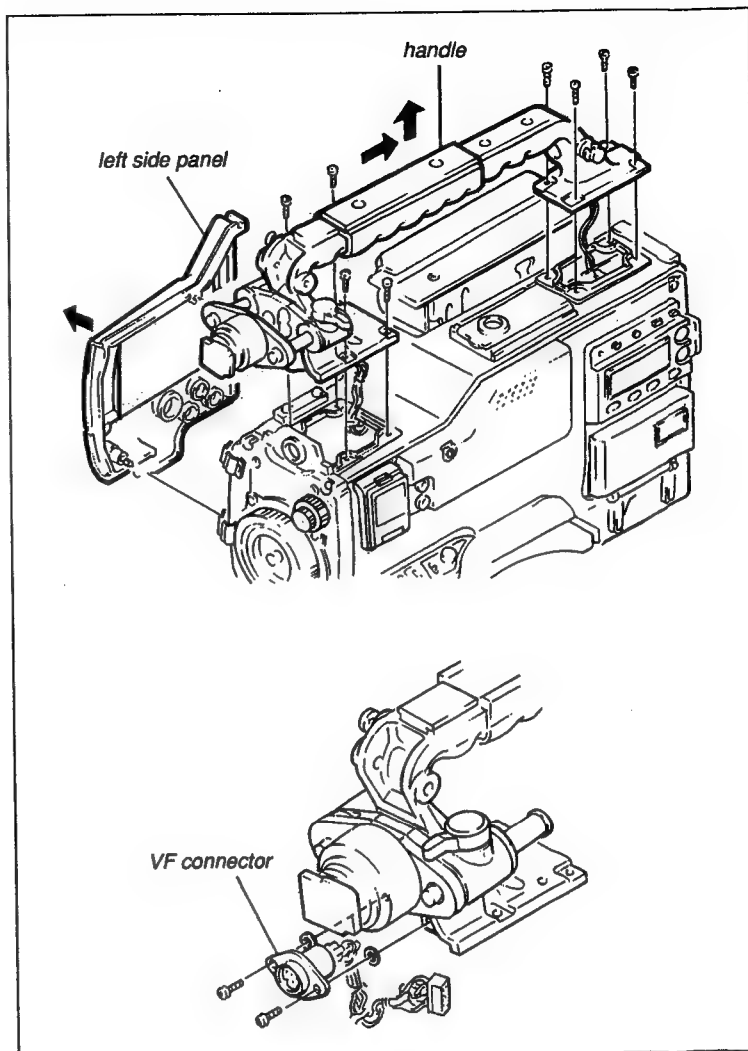
- When installing, pay full attention to the arrangement of the harness.
(REFER TO 3-17. HOW TO ARRANGE THE VF HARNESS.)
If it is incorrectly arranged, the harness may easily break, etc. when using the VF.
Insert the anode cable relay connector until it locks.



4-3. REPLACEMENT OF THE VF CONNECTOR

Replacement procedure:

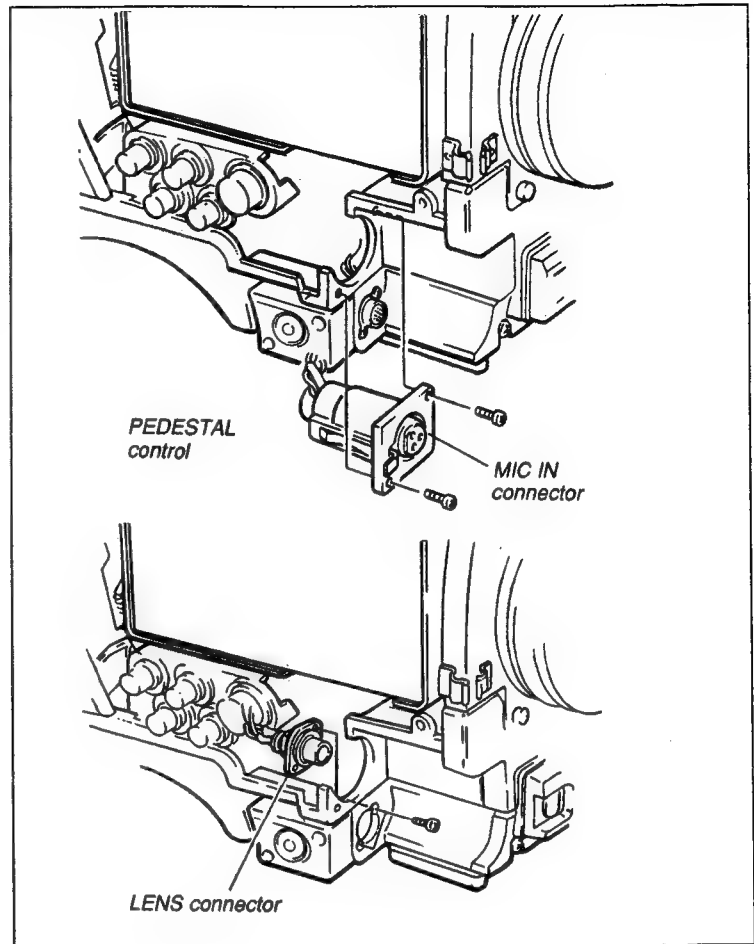
- (1) Open the Cassette-up Compartment Lid (put the unit into EJECT mode), remove the left side panel.
- (2) Move the Viewfinder forwards.
- (3) Remove the fixing screws shown in the figure and remove the handle.
- (4) Remove the two screws fixing the VF connector onto the handle and disconnect the CN50 on the MB-440/440P Board, then remove the VF connector with the harnesses.
- (5) Assemble the VF connector by reversing steps for removal.



4-4. REPLACEMENT OF THE LENS CONNECTER

Replacement procedure:

- (1) Open the Cassette-up Compartment Lid (put the unit into EJECT mode), remove the left side panel.
- (2) Remove the two fixing screws and disconnect the CN25 on the MB-440/440P Board, and then remove the MIC IN connector.
- (3) Remove the two fixing screws and disconnect the CN1 on the IO-74 Board, and then remove the LENS connector.
- (4) Assemble the new LENS connector by reversing steps for removal.

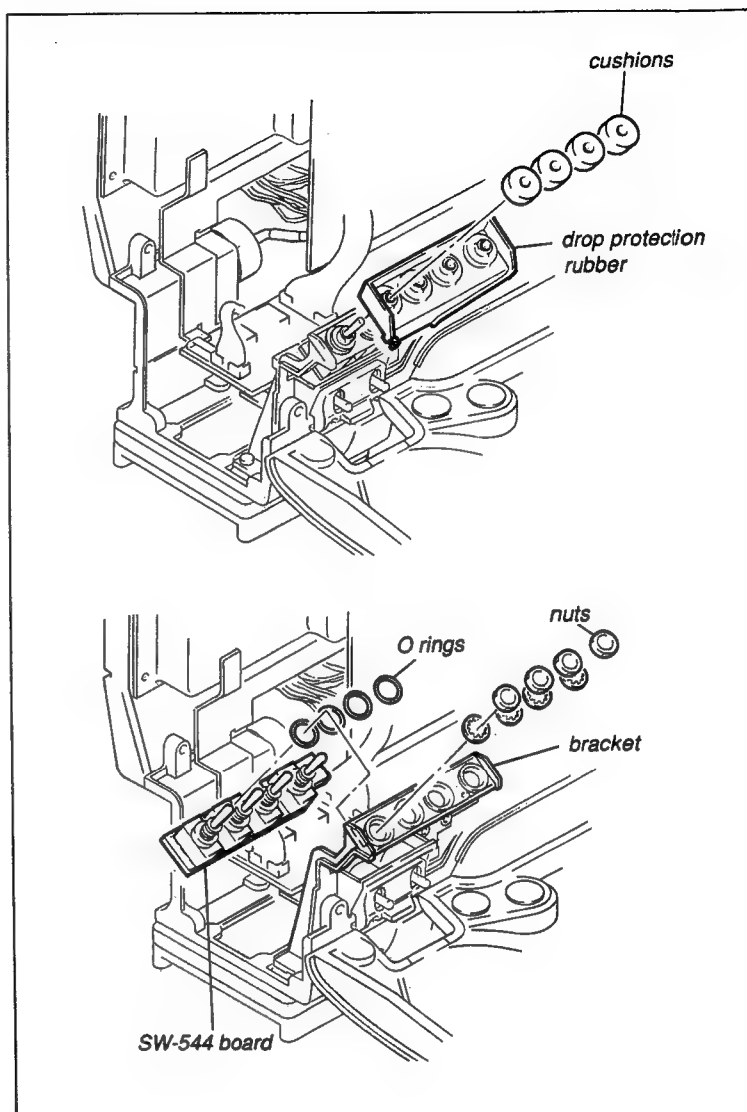


4-5. REPLACEMENT OF THE FUNCTION SWITCHES

- VTR SAVE/ST. BY, GAIN, OUTPUT/DCC, WHITE BAL switches

Replacement procedure:

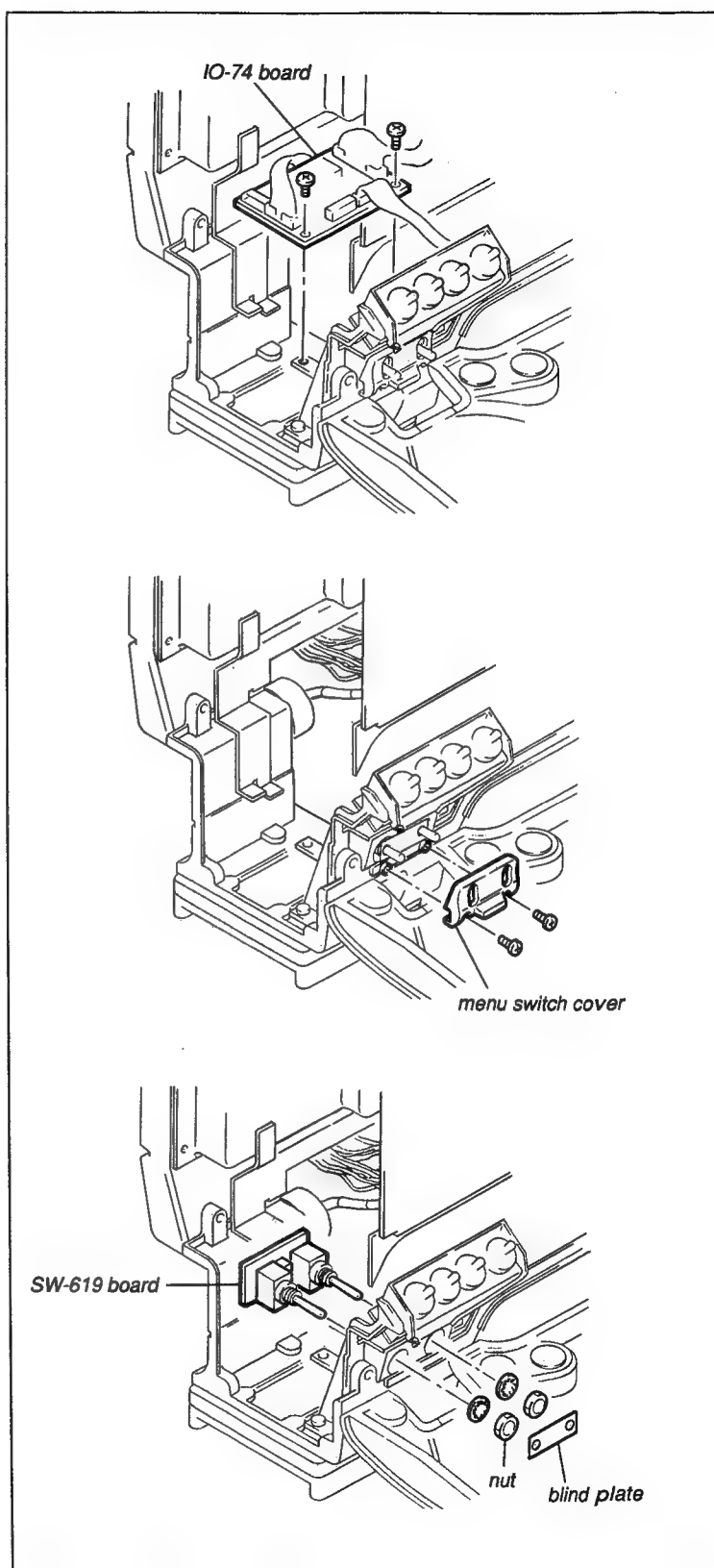
- (1) Open the right side panel.
- (2) Remove the Front Assembly.
(Refer to Section 4-1. Replacement of the CCD unit.)
- (3) Remove the cushions of each switch.
- (4) Remove the Drop Protection Rubber.
- (5) Remove the nut fixing the switch with a box driver and remove the SW-544 Board.
- (6) Remove a defective switch from the SW-544 Board and replace it a new one.
- (7) Confirm that an O ring is inserted between the switch and bracket. (O ring is supplied with a switch.) Install the SW-544 Board in the reverse order of removal.



• MENU switch

Replacement procedure:

- (1) Open the right side panel.
- (2) Remove the Front Assembly.
(Refer to Section 4-1. Replacement of CCD unit.)
- (3) Remove the IO-74 Board.
- (4) Remove the two screws and Menu Switch Cover.
- (5) Remove the Blind Plate. Remove the nut fixing the switch with a box driver and remove the SW-619 Board.
- (6) Remove a defective switch from the SW-619 Board and replace it a new one.
- (7) Install the SW-619 Board in the reverse order of removal.



4-6. REPLACEMENT OF THE DRUM ASSEMBLY

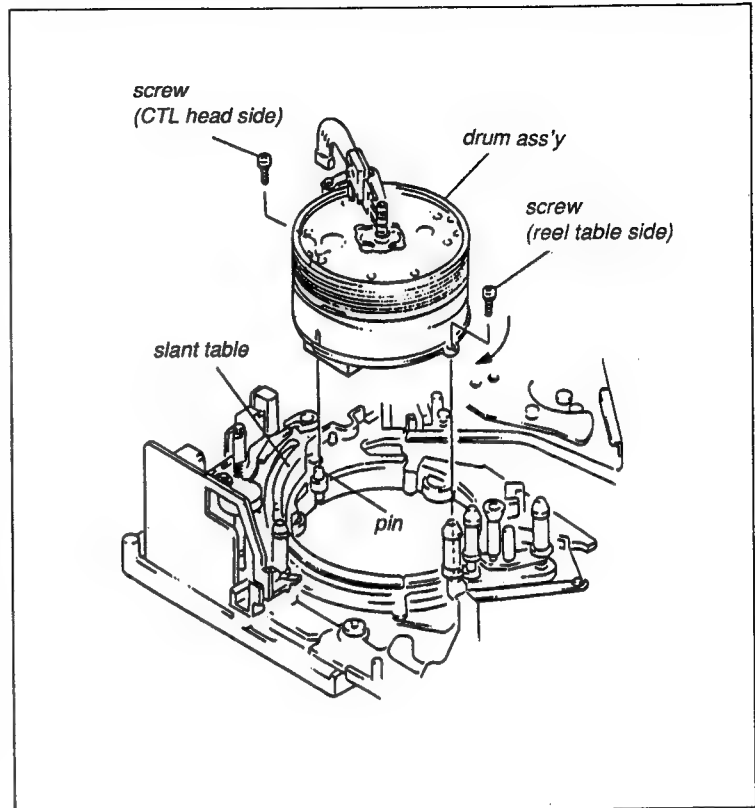
- When replacing the Drum Assembly, be careful not to touch the Video Head.

Tool: Tweezers

Mode: EJECT

Replacement procedure:

- (1) Disconnect the flexible board (FL-54 Board) of the Slip Ring which is connected to CN5 on the TB-5 Board with tweezers. (Refer to Section 3-9.)
- (2) Remove the two fixing screws of the Drum Assembly and remove the Drum Assembly from the unit. When removing, raise the Drum Assembly straightly up because the connectors CN41 and CN42 at the bottom of the drum are inserted into the mother board (MB-440/440P Board).
- (3) Install the new Drum Assembly in the unit so that the Slant Table Pin is inserted into the hole of the new Drum Assembly.
- (4) Push the Drum Assembly against the direction of arrow so that the Drum Assembly is free of play and tighten the fixing screw at the Reel Table side. Then tighten the fixing screw at the CTL Head side.
- (5) Insert and lock the flexible board (FL-54 Board) of the Slip Ring into connector CN5 on the TB-5 Board with tweezers. (Refer to Section 3-9.)
- (6) After replacement, perform the adjustments in Section 4-42.



4-7. REPLACEMENT OF THE UPPER DRUM ASSEMBLY

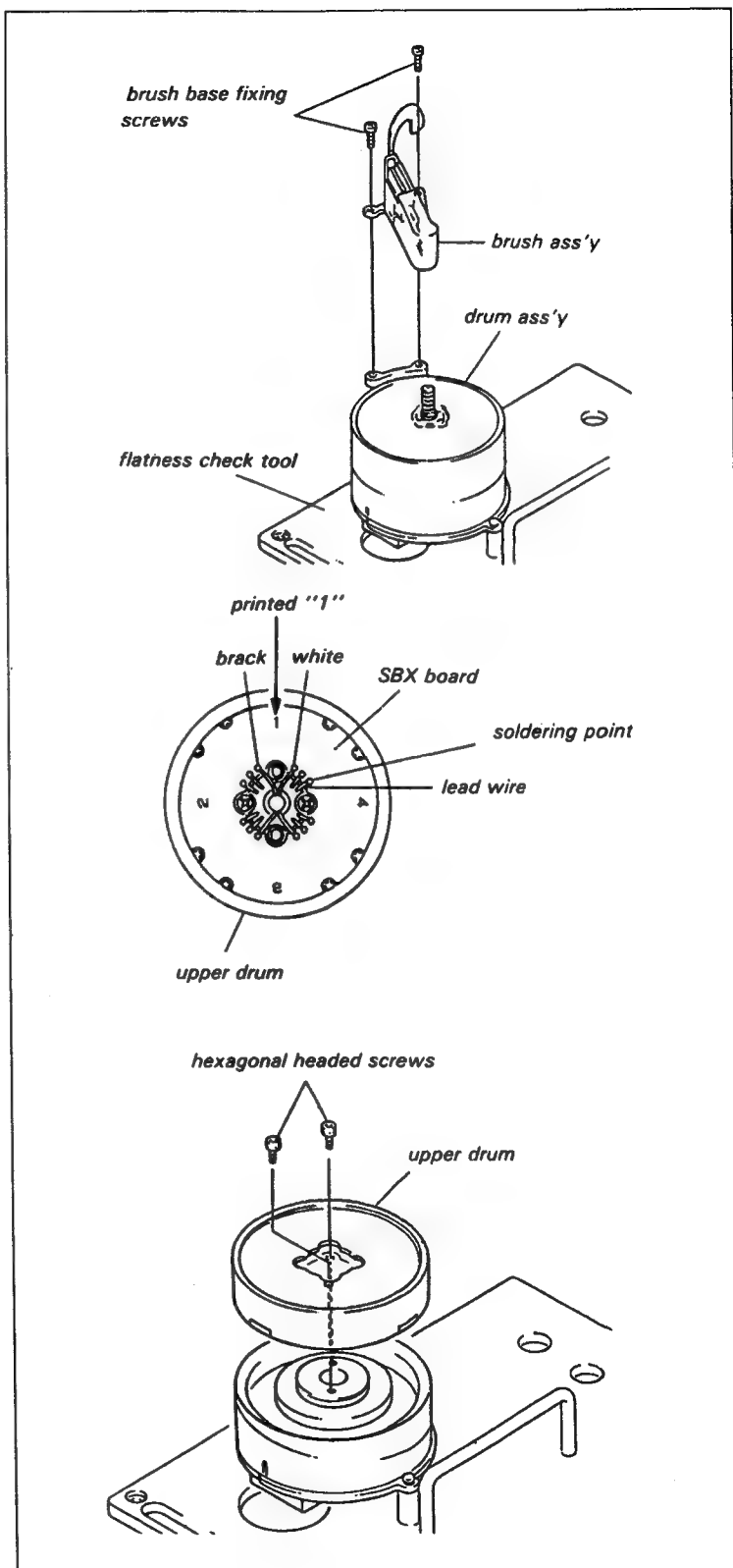
- When replacing the Upper Drum Assembly, be careful not to touch the Video Head.

Tool: Flatness check tool
 Drum eccentricity gauge (3)
 Drum eccentricity gauge (2)
 Drum eccentricity gauge (6)
 Tweezers
 L-shaped hexagonal wrench (across flat has 1.5mm)

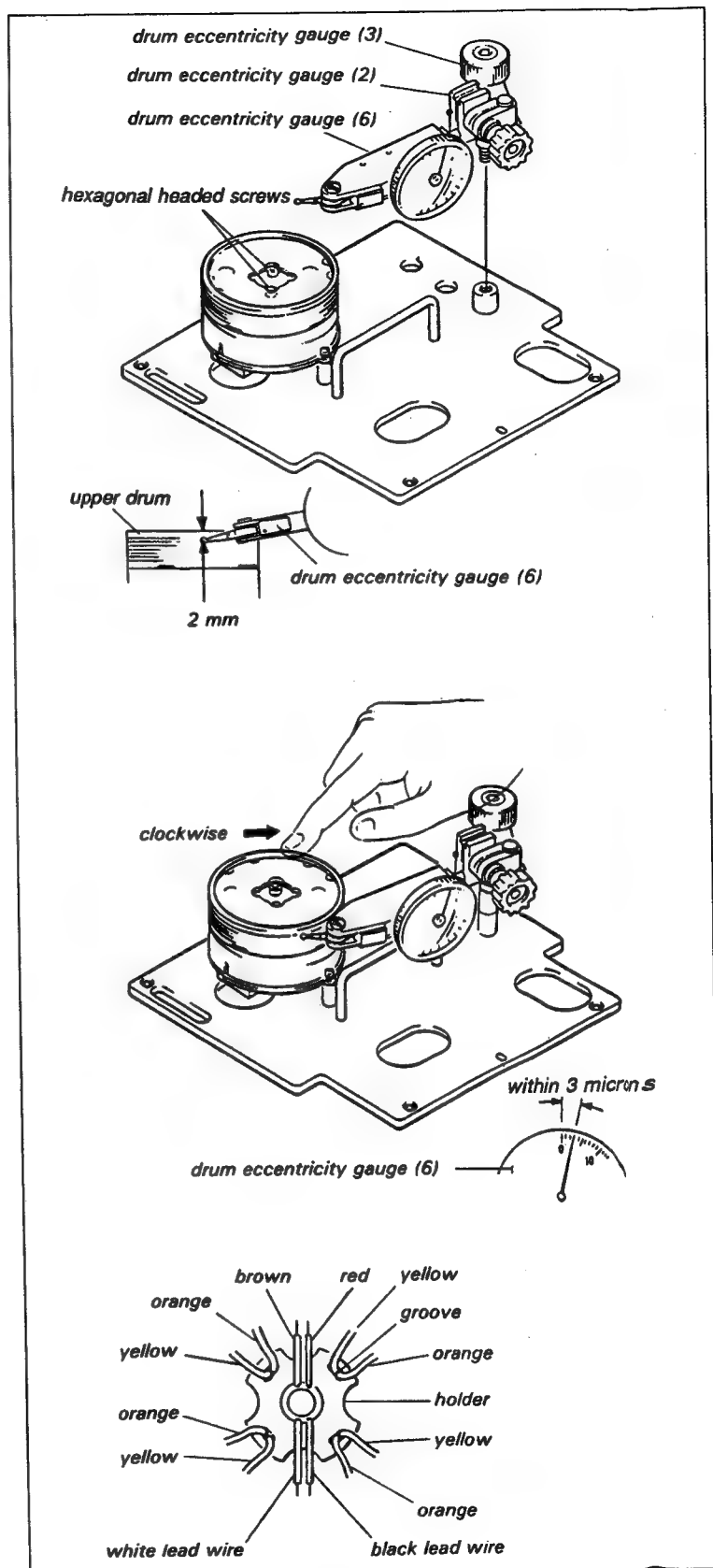
Mode: EJECT

Replacement procedure:

- (1) Remove the Drum Assembly from the unit as described in Steps (1) and (2) in Section 4-6.
- (2) Install the Drum Assembly on the flatness check tool.
- (3) Remove the two brush base fixing screws and remove the Brush Assembly from the Drum Assembly.
- (4) Remove the two hexagonal headed screws from the Upper Drum Assembly with the L-shaped hexagonal wrench, then remove the Upper Drum Assembly from the Drum Assembly.
- (5) Remove the Slip Ring Assembly from the removed Upper Drum Assembly as described in Section 4-8.
- (6) Put the new Upper Drum Assembly on the flange.
- (7) Thread the hexagonal headed screws on the new Upper Drum Assembly to the flange snugly but do not tighten.



- (8) Assemble the drum eccentricity gauges (3), (2), (6), and install them on the flatness check tool.
- (9) Adjust the position of gauge so that the tip probe is positioned at the point about 2mm from the top edge of the Upper Drum.
- (10) Turn the Upper Drum Assembly slowly clockwise and confirm that the pointer deflection of the gauge is within 3 microns during one complete turn.
If the specification is satisfied, perform Step (12) and later. If not, Perform Step (11) and later.
- (11) To satisfy the specification, adjust the position of the upper drum assembly by moving it manually.
- (12) After adjustment, alternately tighten the two hexagonal headed screws.
- (13) Confirm that the specification is satisfied once again.
- (14) Install the Slip Ring Assembly removed in Step (5) as described in Section 4-8.
- (15) Install the Brush Assembly.
- (16) Perform the Brush Position Adjustment in Section 6-16-1.
- (17) Remove the Drum Assembly from the flatness check tool.
- (18) Perform steps (3) through (6) in Section 4-6.



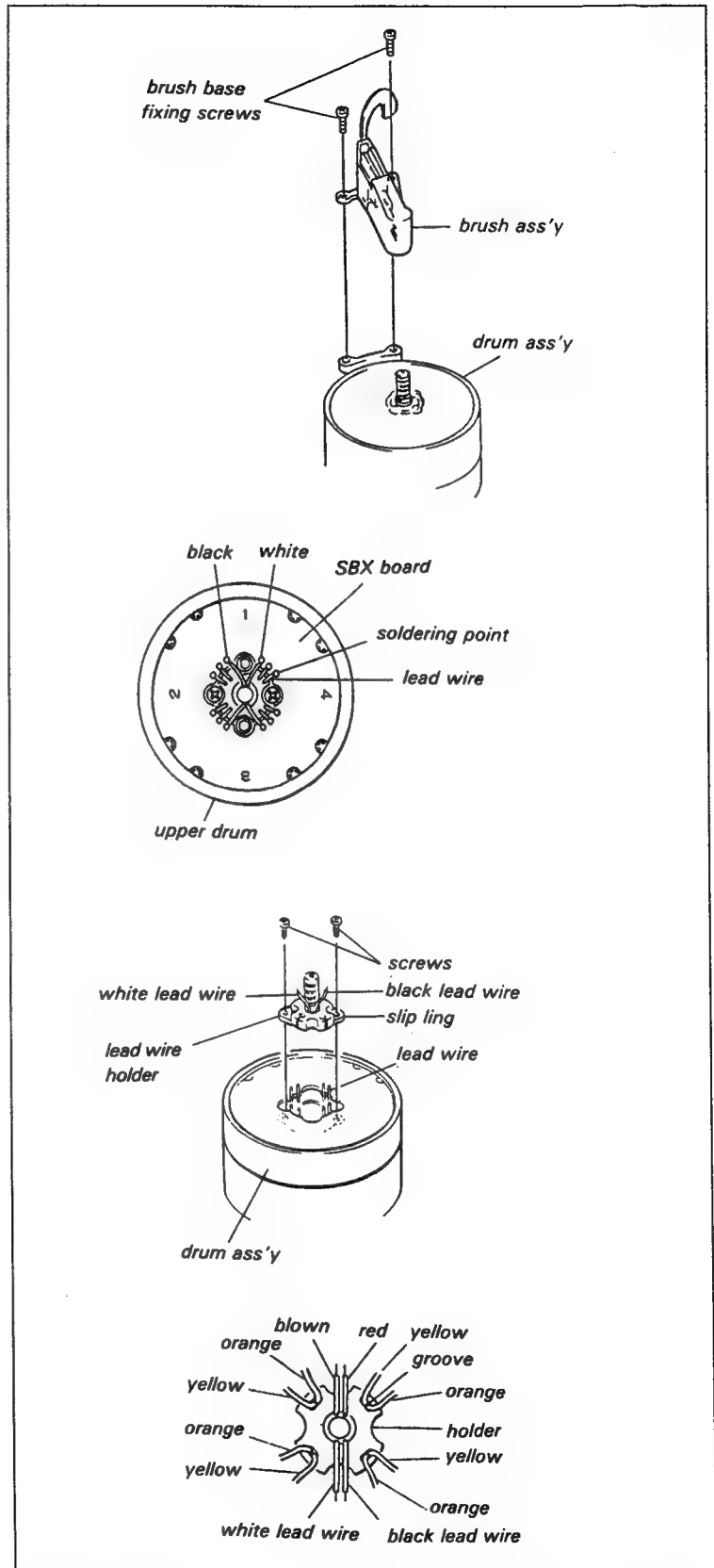
4-8. REPLACEMENT OF THE SLIP RING ASSEMBLY

Tool: Tweezers

Mode: EJECT

Replacement procedure:

- (1) Disconnect the flexible board (FL-54 Board) of the slip ring which is connected to CN5 on the TB-5 Board with tweezers. (Refer to Section 3-9.)
- (2) Remove the two brush base fixing screws and remove the Brush Assembly from the unit.
- (3) Desolder the four lead wires of the Slip Ring from the SBX Board of the Upper Drum Assembly.
- (4) Remove the other eight lead wires from the lead wire holder.
- (5) Remove the two screws of the Slip Ring, then remove the Slip Ring from the unit.
- (6) Arrange the black and white lead wires of the new Slip Ring so that they are facing the side of the SBX Board with the silk screen printed "1", and put on the Drum Assembly. At that time, insert the eight lead wires removed in Step (4) into the four grooves of the lead wire holder as shown in the figure.
- (7) Install the Slip Ring onto the Drum Assembly with the two screws.
- (8) Solder the twelve lead wires on the SBX Board as shown in the figure.
- (9) Install the Brush Assembly.
- (10) Perform the Brush Position Adjustment in Section 6-16-1.
- (11) Install and lock the flexible board (FL-54 Board) of the Slip Ring into CN5 on the TB-5 Board with tweezers. (Refer to section 3-9.)

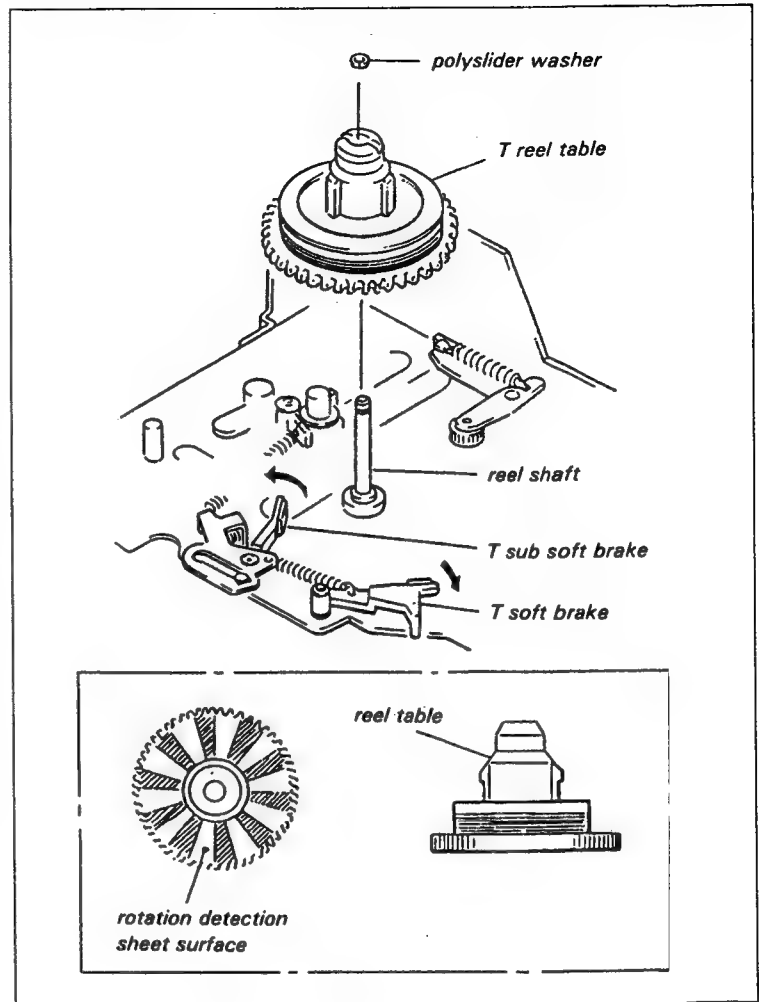


4-9. REPLACEMENT OF THE TAKE-UP SIDE REEL TABLE

Mode: EJECT

Replacement:

- (1) Remove the Brake Slider referring to Section 4-17.
- (2) Remove the polyslider washer at the top of the T Reel Table.
- (3) Release the pressures of the T Sub Soft Brake and T Soft Brake from the T Reel Table while pressing them in the direction of the arrows, and remove the T Reel Table from the unit.
- (4) Clean the reel shaft with a cleaning piece moistened with cleaning fluid.
- (5) Clean the Rotation Detection Sheet surface of the new T Reel Table and the reel table's outer circumference with a cleaning piece moistened with cleaning fluid.
- (6) Release the T Sub Soft Brake and T Soft Brake as in Step (3), insert the T Reel Table onto the Reel Shaft, and fasten it with the 1.2mm diameter polyslider washer.
- (7) While releasing the T Sub Soft Brake, rotate the T Reel Table by hand to check that it rotates smoothly.
- (8) Install the Brake Slider referring to Section 4-17.
- (9) After replacement, while releasing the T Soft Brake and T Sub Soft Brake, rotate the T Reel Table, and check that it rotates smoothly.

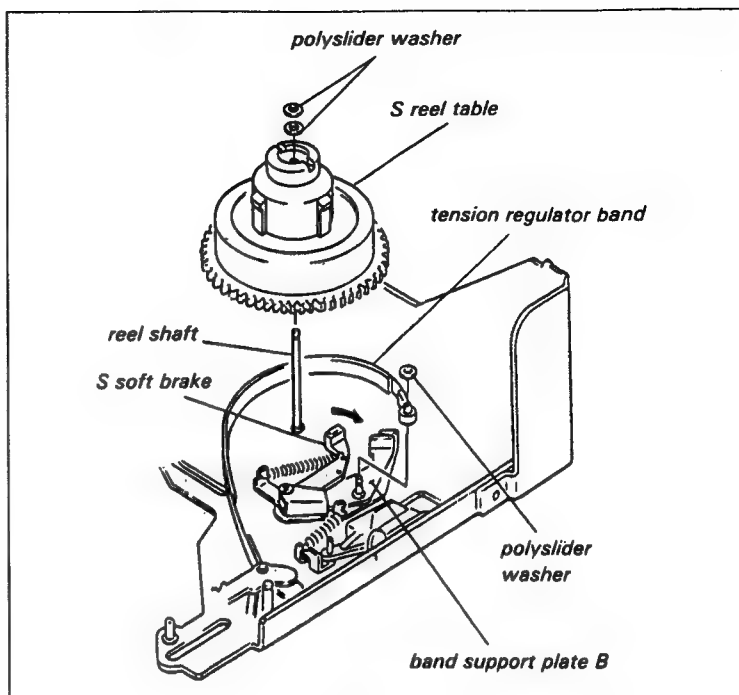


4-10. REPLACEMENT OF THE SUPPLY SIDE REEL TABLE

Mode: EJECT

Replacement procedure:

- (1) Remove the polyslider washer (shown in the figure) fixing the Tension Regulator Band.
- (2) Remove the polyslider washer at the top of the S Reel Table.
- (3) Release the pressure of the S Soft Brake from the S Reel Table while pressing it in the direction of the arrow, and remove the S Reel Table from the unit.
- (4) Clean the reel shaft with a cleaning piece moistened with cleaning fluid.
- (5) Clean the Rotation Detection Sheet surface of the a new S Reel Table and the reel table's outer circumference with a cleaning piece moistened with cleaning fluid.
- (6) Release the S Soft Brake as in Step (3), insert the S Reel Table onto the reel shaft, and fasten it with the 2mm diameter polyslider washer and the 1.2mm diameter polyslider washer.
- (7) Insert the Tension Regulator Band onto the shaft of the Band Support B Assembly and fasten it with the 1.2mm diameter polyslider washer.
- (8) After replacement, while releasing the S Soft Brake, rotate the S Reel Table by hand to check that it rotates smoothly.
- (9) After replacement, perform the adjustments in Section 4-42.



4-11. REPLACEMENT OF THE TAKE-UP SIDE DRIVING GEAR

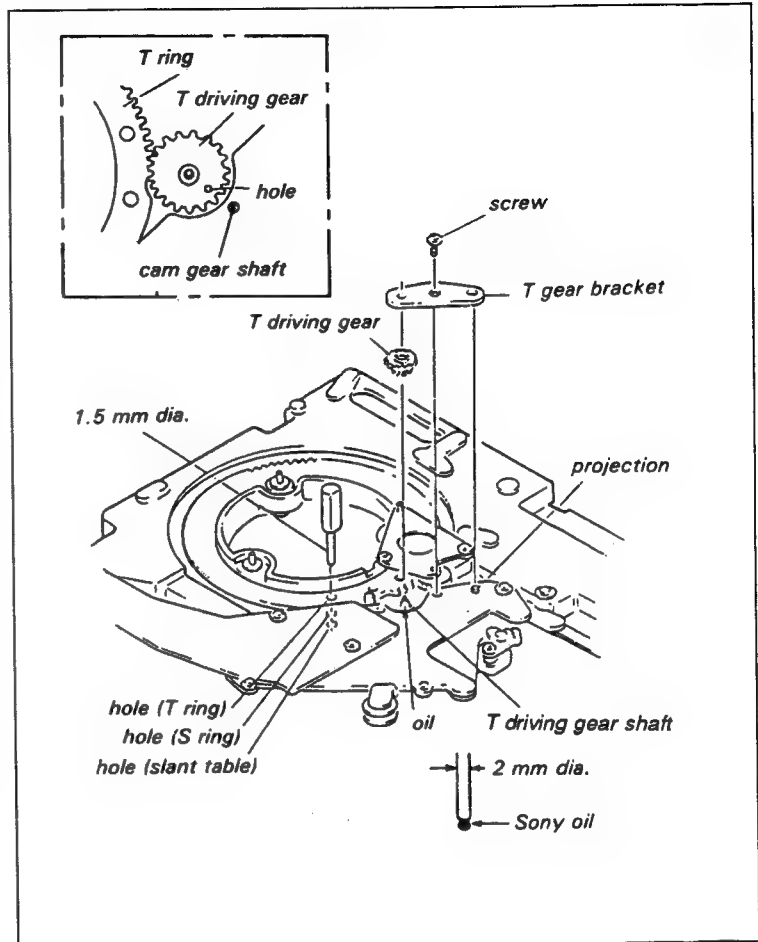
- When replacing the T Driving Gear, remove the Mechanical Deck Block from the unit.
(Refer to Section 3-12.)

Tool: 1.5mm diameter rod

Mode: EJECT

Replacement procedure:

- (1) Remove the Mechanical Deck Block from the unit. (Refer to Section 3-12.)
- (2) Remove a fixing screw of the T Gear Bracket and remove the T Gear Bracket and T Driving Gear from the back of the Mechanical Deck Block.
- (3) Clean the T Driving Gear Shaft with a cleaning piece moistened with cleaning fluid.
- (4) Apply a half drop of Sony oil on the above shaft.
(One drop of Sony oil is about amount that remains on the tip of 2mm diameter rod dipped in oil.)
- (5) Align the three holes (1.5mm dia.) of the Threading Ring (take-up side), Threading Ring (supply side), and Slant Table, then pass a rod (1.5mm dia.) through the holes.
- (6) Insert the T Driving Gear onto the shaft so that the positional relationship between the T Driving Gear hole and Cam Gear Shaft are aligned as shown in the detail figure.
- (7) Install the T Gear Bracket with a fixing screw.
- (8) Repeat threading and unthreading two or three times and check that they can be done smoothly.



4-12. REPLACEMENT OF THE SUPPLY SIDE DRIVING GEAR

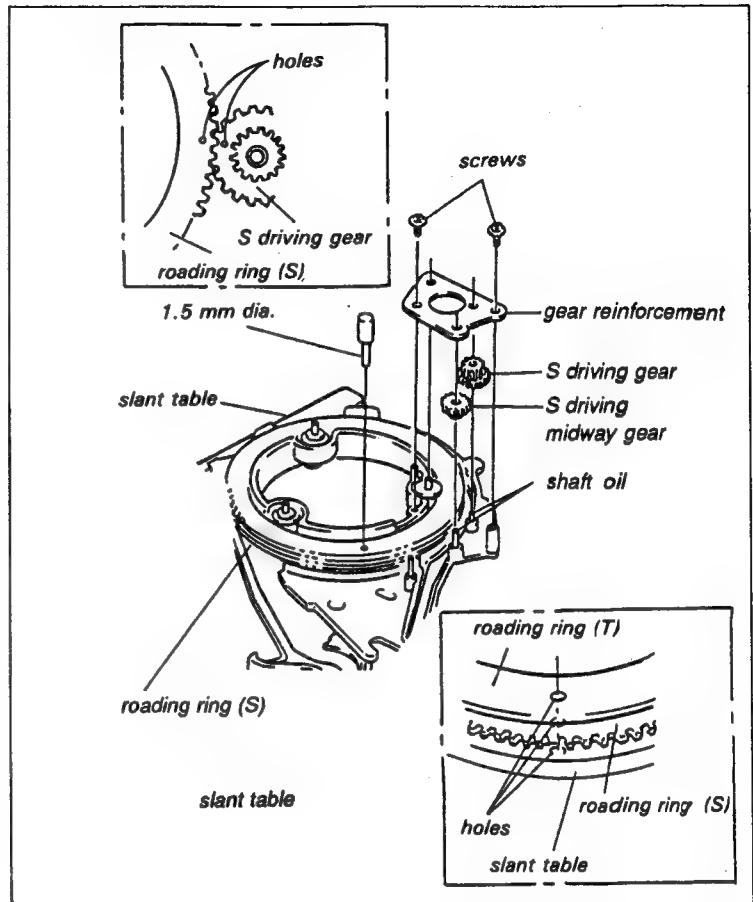
- When replacing the S Driving Gear, remove the Mechanical Deck Block from the unit.
(Refer to Section 3-12.)

Tool: 1.5mm diameter rod

Mode: EJECT

Replacement procedure:

- (1) Remove the Mechanical Deck Block from the unit. (Refer to Section 3-12.)
- (2) Remove the two fixing screws of the Gear Reinforcement, and then remove the Gear Reinforcement, S Driving Midway Gear, and S Driving Gear from the back of the Mechanical Deck Block.
- (3) Clean the S Driving Midway Gear and S Driving Gear Shafts with a cleaning piece moistened with cleaning fluid.
- (4) Apply a half drop of Sony oil on the above two shafts.
- (5) Align the three holes (1.5mm dia.) of the Threading Ring (take-up side), Threading Ring (supply side), and Slant Table, then pass one rod (1.5mm dia.) through the holes.
- (6) Insert the S Driving Gear onto the shaft so that the positional relationship between the S Driving Gear hole and Threading Ring (supply side) hole are aligned as shown in the detail figure.
- (7) Insert the S Driving Midway Gear and install the Gear Reinforcement with two fixing screws.
- (8) Repeat threading and unthreading two or three times and check that they can be done smoothly.

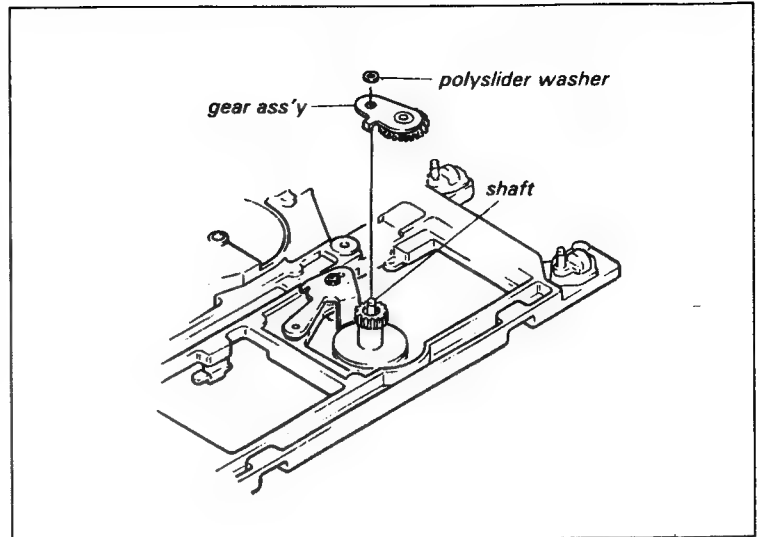


4-13. REPLACEMENT OF THE GEAR ASSEMBLY

Mode: EJECT

Replacement procedure:

- (1) Remove the polyslider washer at the top of the Gear Assembly.
- (2) Clean the shaft of the Gear Assembly with a cleaning piece moistened with cleaning fluid.
- (3) Insert the new Gear Assembly onto the shaft, push a polyslider washer onto the shaft, and fasten the Gear Assembly.
- (4) Perform the PLAY, F.FWD, and REW operations two or three times and check that they can be done smoothly.
- (5) After replacement, perform the Gear Assembly Position Adjustment in Section 5-1.



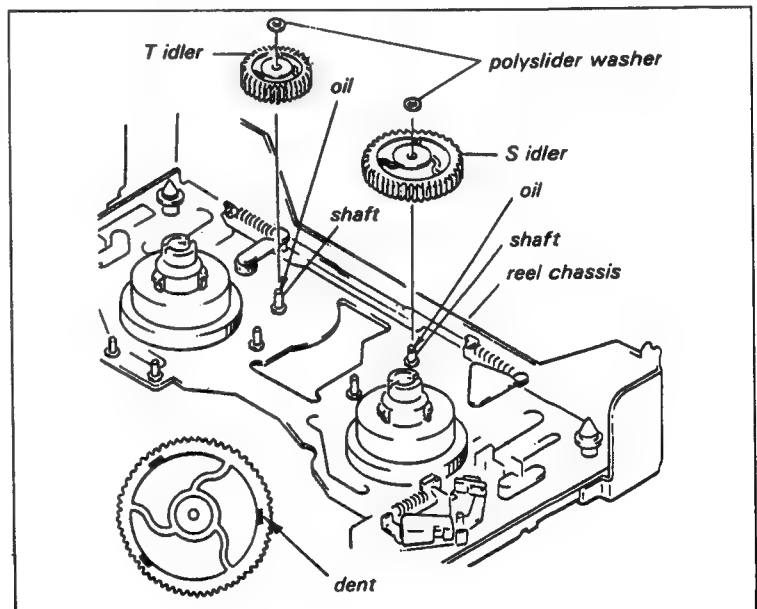
4-14. REPLACEMENT OF THE SUPPLY/TAKE-UP SIDE IDLER

- Since the S and T Idlers are replaced in the same manner, only replacement of the S Idler is described below.

Mode: EJECT

Replacement procedure:

- (1) Remove the polyslider washer and remove the S Side Idler from the unit.
- (2) Clean the Reel Shaft with a cleaning piece moistened with cleaning fluid.
- (3) Apply an 1/4 drop of Sony oil on the shaft.
- (4) As shown in the figure, install the S Idler in the unit with the S Idler surface's three dents faced to the reel chassis (the lower position).
- (5) Fasten the S Idler with the 1.2mm diameter polyslider washer.



4-15. REPLACEMENT OF THE TENSION REGULATOR BAND

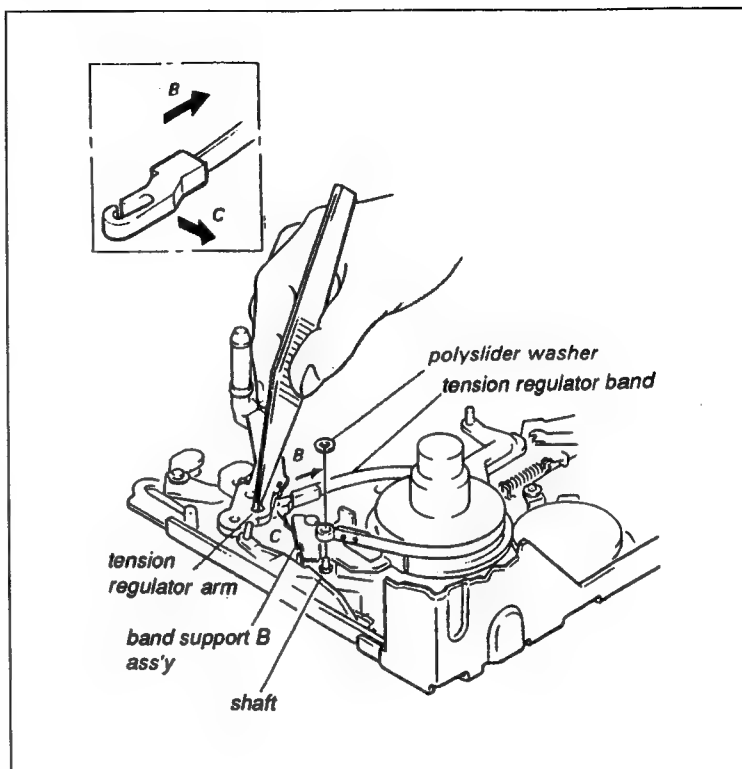
- When replacing the Tension Regulator Band, be careful not to touch or bend the band felt portion.

Tool: Tweezers

Mode: Threading end

Replacement procedure:

- (1) Put the unit into the threading end mode. (Refer to the Precautions when Replacing Parts.)
- (2) Remove the polyslider washer shown in the figure.
- (3) Push the Arm Hook of the Tension Regulator Band in the opposite direction of the arrow B.
- (4) Insert tweezers into the hole of the Tension Regulator Arm shown in the figure, and hold the hook and push it in the direction of the arrow C, then remove the Tension Regulator Band.
- (5) Insert the hook of a new Tension Regulator Band into the lower portion of the Tension Arm in the direction indicated by the figure and push the hook in the opposite direction of the arrow C to lock it to the pin.
- (6) Pull the hook of the Tension Regulator band in the direction of the arrow B.
- (7) Taking care not to bend the Tension Regulator Band, wind it around the S Reel.
- (8) Insert another hook of the Tension Regulator Band onto the shaft of the Band Support B Assembly and fasten it with 1.2mm diameter polyslider washer onto the shaft.
- (9) After replacement, perform the adjustments in Section 4-42.



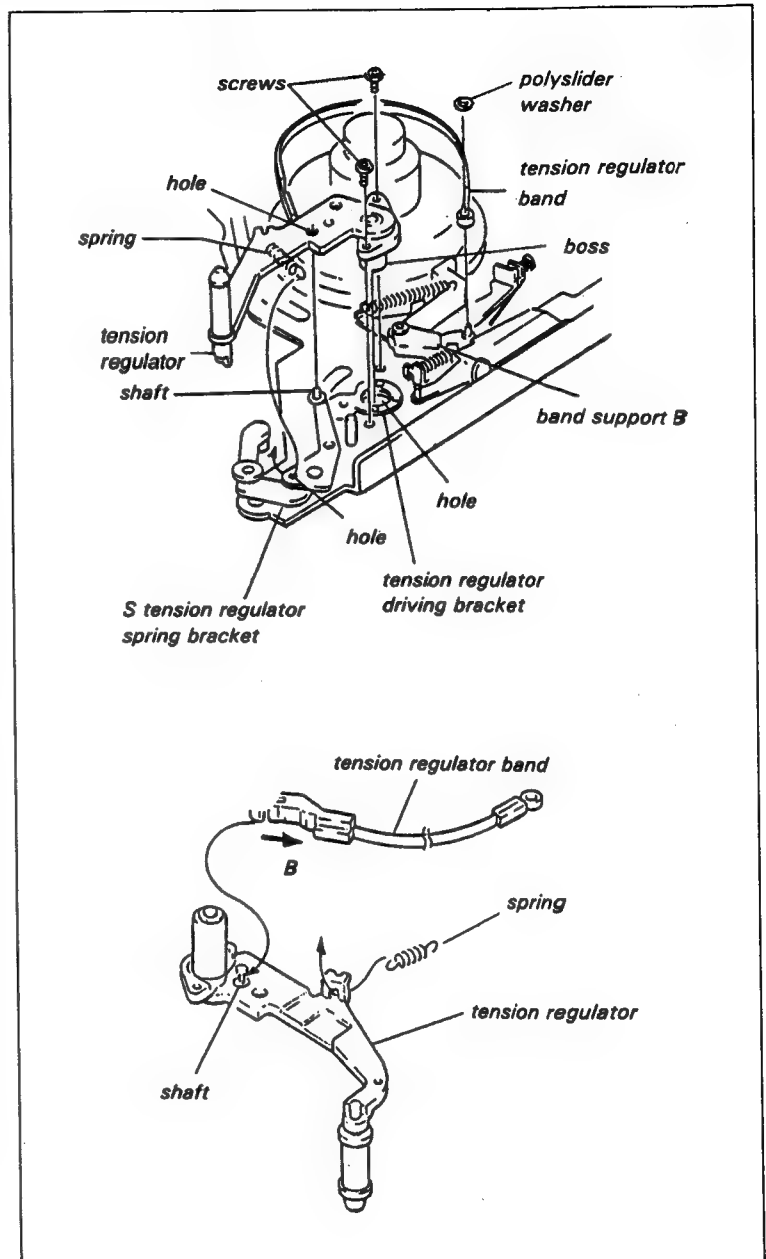
4-16. REPLACEMENT OF THE TENSION REGULATOR

- When replacing the Tension Regulator, remove the Tension Regulator Band from the unit. Be careful not to touch or bend the band felt portion.

Mode: EJECT

Replacement procedure:

- (1) Remove the polyslider washer fixing the Tension Regulator Band.
- (2) Remove the spring shown in the figure from the S Tension Regulator Spring Bracket.
- (3) Remove the two fixing screws of the Tension Regulator and remove the Tension Regulator from the unit.
- (4) Remove the spring (removed in Step (2)) from the removed Tension Regulator and install it on the new Tension Regulator in the direction as shown in the figure.
- (5) Remove the Tension Regulator Band from the removed Tension Regulator and install it on the new Tension Regulator in the direction shown in the figure. After installation, pull the band in the direction of the arrow B.
- (6) Align the hole of the Tension Regulator Driving Bracket with the reel chassis hole.
- (7) Insert the Tension Regulator Boss into the reel chassis hole. Adjust the Tension Regulator position so that the Driving Bracket Shaft is inserted into the illustrated hole of the Tension Regulator.
- (8) Install the Tension Regulator with the two screws.
- (9) Install the spring (removed in Step (2)) on the S Tension Regulator Spring bracket in the direction as shown in the figure.
- (10) Being careful not to bend the Tension Regulator Band, wind it around the S Reel.
- (11) Insert the other hook of the band onto the shaft of the Band Support B Assembly and insert the 1.2mm diameter polyslider washer onto the shaft.
- (12) After replacement, perform the adjustments in Section 4-42.

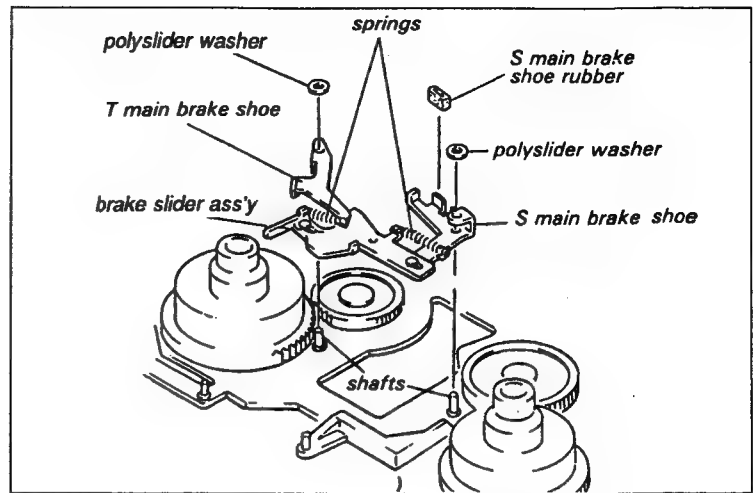


4-17. REPLACEMENT OF THE MAIN BRAKE SHOE

Mode: EJECT

Replacement procedure:

- (1) Remove the T or S Brake Shoe Rubber.
- (2) Install the new Brake Shoe Rubber.

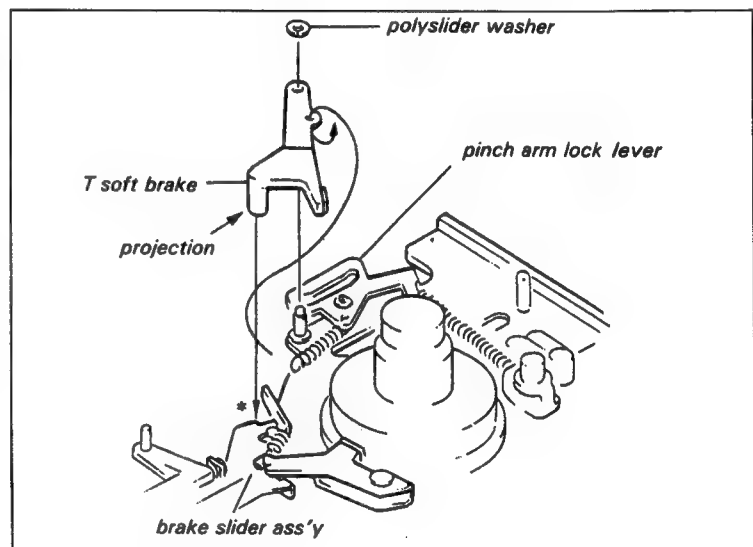


4-18. REPLACEMENT OF THE TAKE-UP SIDE SOFT BRAKE

Mode: EJECT

Replacement procedure:

- (1) Remove the spring from the Pinch Arm Lock Lever which is hooked to the T Soft Brake.
- (2) Remove the polyslider washer and remove the T Soft Brake from the unit.
- (3) Install the T Soft Brake to the unit so that the projection of the new T Soft Brake is positioned to the * marked portion of the Brake Slider Assembly, insert the 1.2mm diameter polyslider washer onto the shaft, and fasten the T Soft Brake.
- (4) Hook the spring of the Pinch Arm Lock Lever to the T Soft Brake.

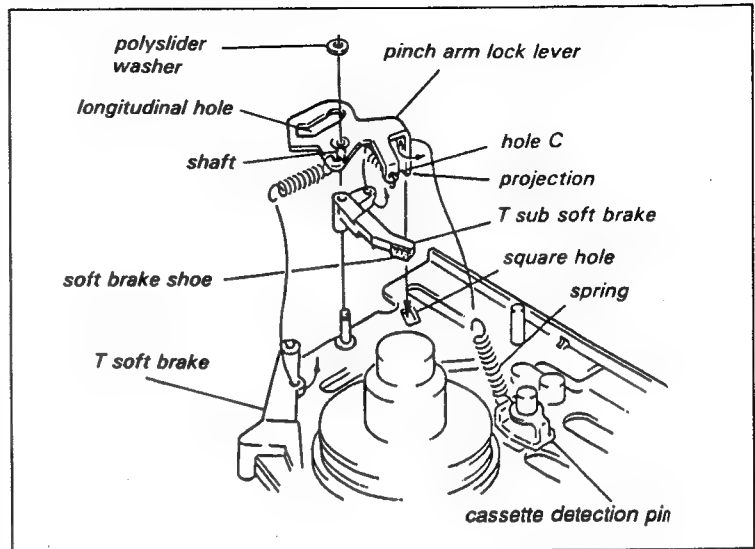


4-19. PLACEMENT OF THE TAKE-UP SIDE SUB SOFT BRAKE

Mode: EJECT

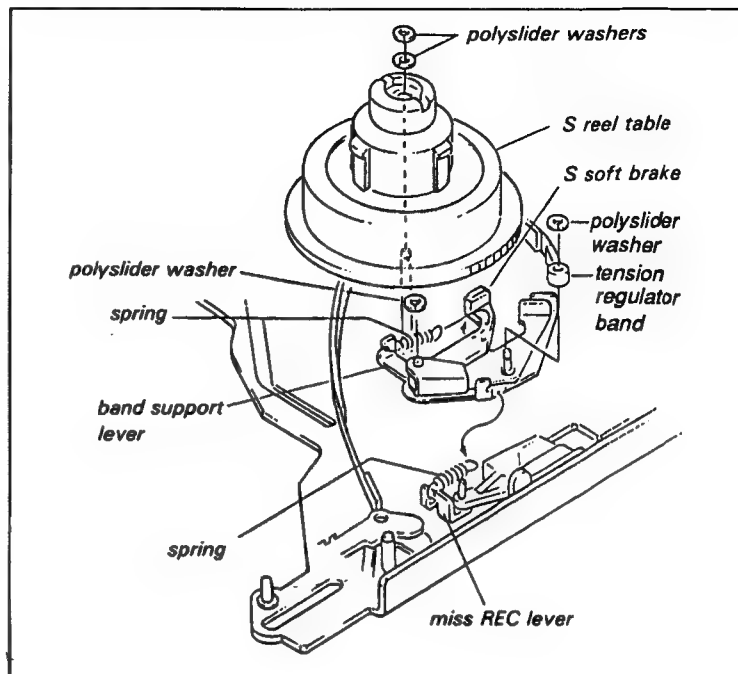
Replacement procedure:

- (1) Remove the spring from the Pinch Arm Lock Lever which is hooked to the T Soft Brake.
- (2) Remove the spring from the Cassette Detection Pin which is hooked to the Pinch Arm Lock Lever.
- (3) Remove the polyslider washer fixing the Pinch Arm Lock Lever and remove the Lock Lever from the unit.
- (4) Remove the spring from the T Sub Soft Brake which is hooked on hole C of the Pinch Arm Lock Lever.
- (5) Remove the spring from the T Sub Soft Brake and hook it on the new T Sub Soft Brake in the direction as shown in the figure.
- (6) Insert the T Sub Soft Brake onto the shaft of the Pinch Arm Lock Lever and hook the spring as shown in the figure.
- (7) Install the Pinch Arm Lock Lever on the unit so that the projection of the Pinch Arm Lock Lever is inserted into the Square hole of the reel chassis, the T Sub Soft Brake Shoe touches the reel table, and the Pinch Arm Roller is inserted into the longitudinal hole of the Lock Lever.
- (8) Insert the 1.2mm diameter polyslider washer onto the shaft and fasten the Lock Lever.
- (9) Hook the spring which is removed in Steps (1) and (2).



4-20. REPLACEMENT OF THE SUPPLY SIDE SOFT BRAKE**Mode:** EJECT**Replacement procedure:**

- (1) Remove the polyslider washer (shown in the figure) fixing the Tension Regulator Band.
- (2) Remove the polyslider washer at the top of the S Reel Table.
- (3) Remove the S Reel Table from the unit while releasing the pressure against the S Reel Table of the S Soft Brake.
- (4) Remove the spring from the Miss REC Lever B hooked on the Band Support Lever.
- (5) Remove the polyslider washer shown in the figure and remove the Band Support Lever from the unit.
- (6) Remove the spring from the S Soft Brake.
- (7) Install the new S Soft Brake and hook the spring removed in Step 4 in the direction as shown in the figure.
- (8) Assemble the S Soft Brake by reversing the Steps (1) through (5).



4-21. REPLACEMENT OF THE COMPONENT PARTS OF TAKE-UP SIDE BASE

- Replacement of the TG-7 (guide roller) on the T Base differs from replacement of the other components.
- Refer to Section 4-21-1 for replacement the TG-7, and refer to Section 4-21-2 for other components.

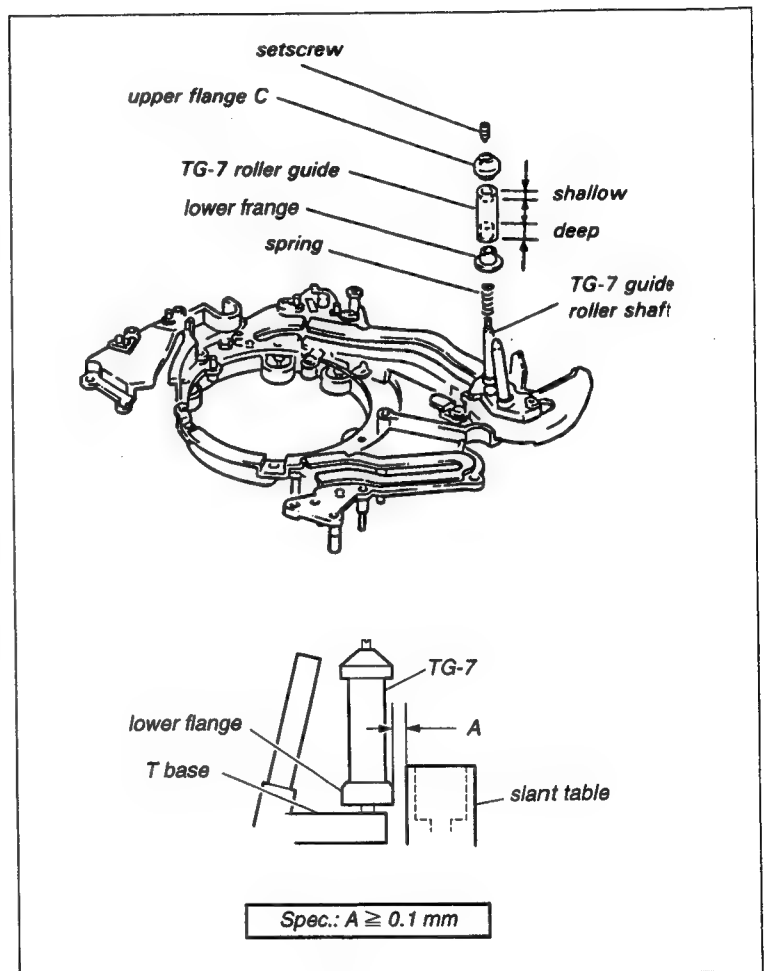
4-21-1. Replacement of the TG-7

Tool: Tape guide adjustment screwdriver

Mode: EJECT

Replacement procedure:

- (1) Loosen the setscrew at the top of the TG-7 with the tape guide adjustment screwdriver.
- (2) Remove the Upper Flange C.
- (3) Remove the TG-7 Roller Guide TG-7, the Lower flange, and the compression spring.
- (4) Clean the TG-7 Guide Roller Shaft with a cleaning piece moistened with cleaning fluid.
- (5) Insert the compression spring removed in Step (3) onto the TG-7 Guide Roller Shaft.
- (6) Carefully insert the Lower Flange and TG-7 Guide Roller onto the TG-7 Guide Roller Shaft in the direction as shown in the figure.
- (7) Install the Upper Flange C.
- (8) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
- (9) Check the clearance A between the lower flange of the TG-7 and the slant table so that it is more than 0.1 mm.
- (10) After replacement, perform the adjustments in Section 4-42.



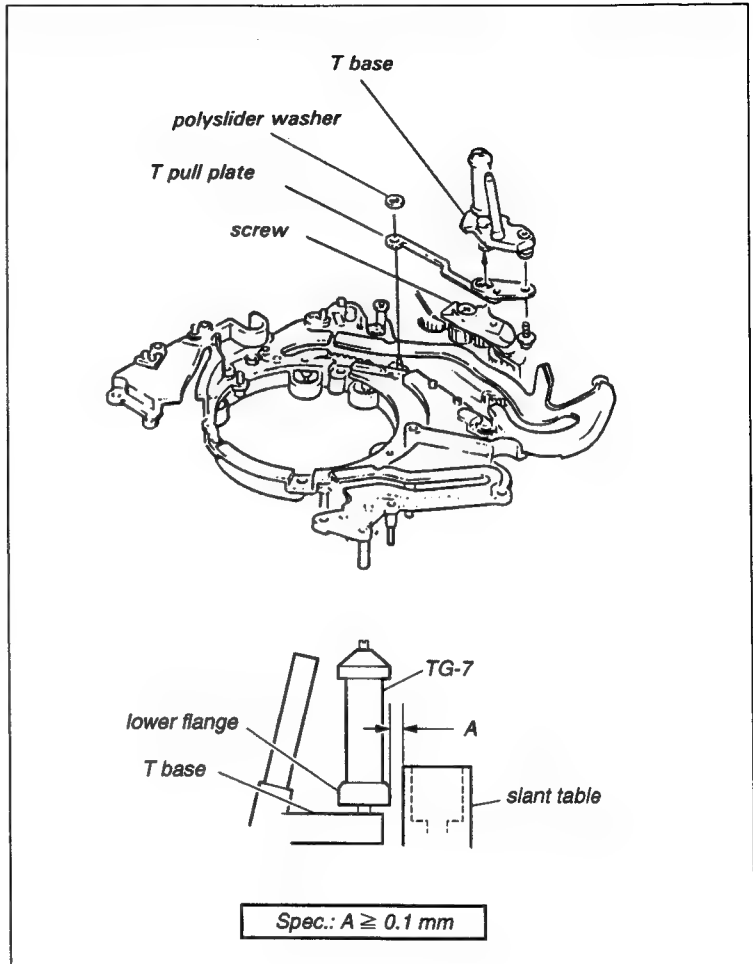
4-21-2. Replacement of the Component Parts of the Take-up Side Base

- For replacement of the TG-7 on the T Side Base, refer to Section 4-21-1.
- When replacing the components other than TG-7 on the T Side Base, remove the Drum from the unit once so as not to damage it.

Mode: Turn the screw shown in the figure so that the Take-up Side Base reaches the end of the Take-up Side Rail (I).

Replacement procedure:

- (1) Remove the Drum Assembly from the unit. (Refer to Section 4-6.)
- (2) Turn the screw and set the Take-up Side Base in the position described above.
- (3) Remove the Take-up Side Rail (I). (Refer to Section 4-43.)
- (4) Remove the polyslider washer fixing the Take-up Side Pull Plate and remove the Take-up Side Base from the unit.
- (5) Replace the faulty component which constitutes the Take-up Side Base.
- (6) Assemble the Take-up Side Base by reversing the Steps (1) through (4).
- (7) Check the clearance A between the lower flange of the TG-7 and the slant table so that it is more than 0.1 mm.
- (8) After replacement, perform the adjustments in Section 4-42.



4-22. REPLACEMENT OF THE COMPONENT PARTS OF THE SUPPLY SIDE BASE

- Replacement of the S Sub Base, TG-4, TG-5, and IR-2 (impedance roller guide) on the S Base differs from replacement of the other components.
- Refer to Section 4-22-1 for TG-4, Section 4-22-2 for TG-5, Section 4-22-3 for IR-2, Section 4-22-4 for S Sub Base, and Section 4-22-5 for replacing the other components.

4-22-1. Replacement of the TG-4

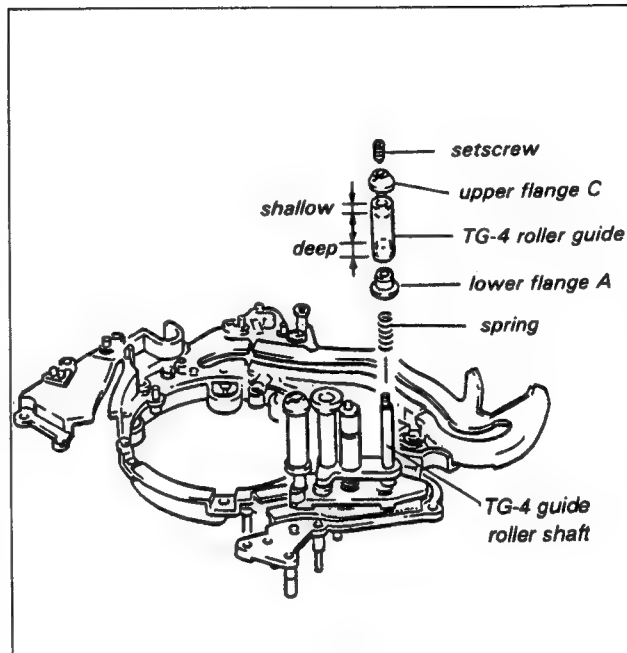
Tool: Tape guide adjustment screwdriver

Mode: EJECT

Replacement procedure:

- (1) Without loosening the setscrew at the top of the TG-4, remove the Upper Flange C by rotating it in the counterclockwise direction with a tape guide adjustment screwdriver.
- (2) Remove the TG-4 Roller Guide, Lower Flange A, and the compression spring.
- (3) Clean the TG-4 Guide Roller Shaft with the cleaning piece moistened with cleaning fluid.
- (4) Insert the compression spring removed in Step (2) onto the TG-4 Guide Roller Shaft.
- (5) Carefully insert the Lower Flange A and TG-4 Roller Guide onto the TG-4 Guide Roller Shaft in the direction as shown in the figure.
- (6) Install the Upper Flange C. Tighten the Upper Flange C by rotating it in the clockwise direction with a tape guide adjustment screwdriver. Be sure not to tighten the Upper Flange C with setscrew.
- (7) After replacement, perform the adjustments in Section 4-42.

- * When replacing the S Sub Base (section 4-22-1), perform the same procedure of TG-4.



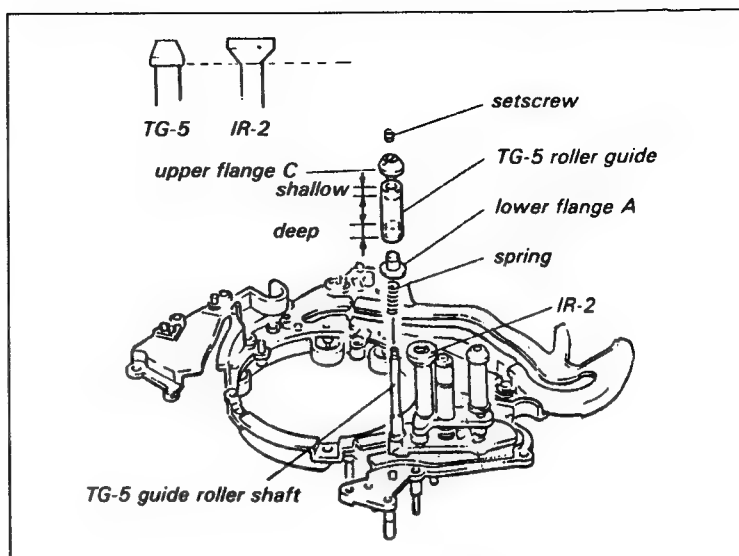
4-22-2. Replacement of the TG-5

Tool: Tape guide adjustment screwdriver

Mode: EJECT

Replacement procedure:

- (1) Loosen the setscrew at the top of TG-5 with the tape guide adjustment screwdriver.
- (2) Remove the Upper Flange C.
- (3) Remove the TG-5 Roller Guide, Lower Flange A, and the compression spring.
- (4) Clean the TG-5 Guide Roller Shaft with a cleaning piece moistened with cleaning fluid.
- (5) Insert the compression spring removed in Step (3) onto the TG-5 Guide Roller Shaft.
- (6) Carefully insert Lower Flange A and the TG-5 Roller Guide onto the TG-5 Guide Roller Shaft in the direction as shown in the figure.
- (7) Install the Upper Flange C, and adjust the position of the TG-5 Guide Roller so that the lower end of the Upper Flange is the same in height as the lower end of the IR-2 Guide Upper Flange as viewed.
- (8) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
- (9) After replacement, perform the adjustments in Section 4-42.



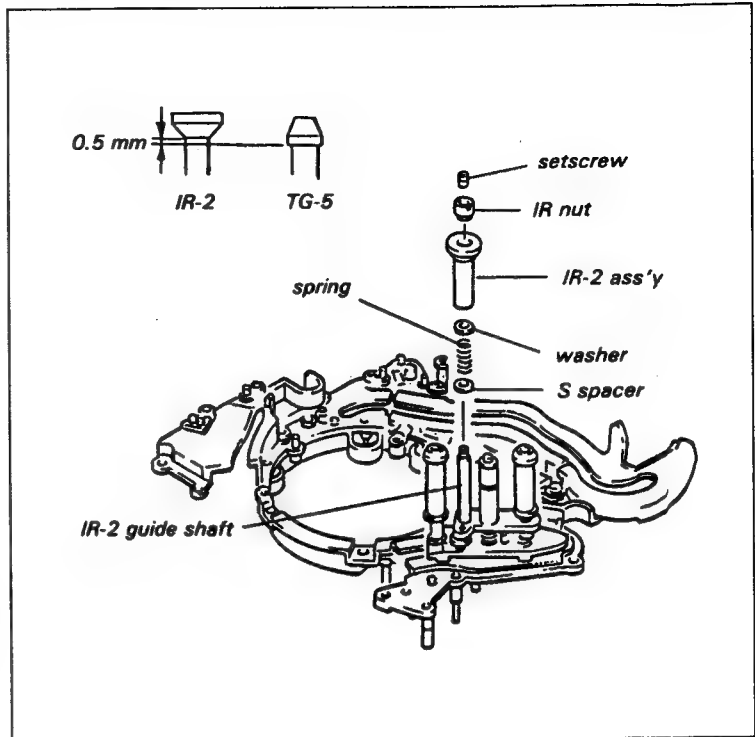
4-22-3. Replacement of the IR-2 Guide (Impedance Roller Guide)

Tool: Tape guide adjustment screwdriver

Mode: EJECT

Replacement procedure:

- (1) Loosen the setscrew at the top of the IR-2 Guide with the tape guide adjustment screwdriver.
- (2) Remove the IR Nut.
- (3) Remove the IR-2 Assembly, washer (1.4mm dia.), compression spring, and S Spacer from the IR-2 Guide Shaft.
- (4) Clean the IR-2 Guide Shaft with a cleaning piece moistened with cleaning fluid.
- (5) Install the S Spacer, compression spring, and washer (1.4mm dia.) removed in Step (3) onto the IR-2 Guide Shaft.
- (6) Carefully insert the new IR-2 Assembly onto the IR-2 Guide Shaft.
- (7) Install the IR Nut, and adjust the position of the IR-2 Guide so that the lower end of the IR-2 Guide Upper Flange is about 0.5mm higher than the lower end of the TG-5 Guide Upper Flange.
- (8) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
- (9) After replacement, perform the adjustments in Section 4-42.



4-22-4. Replacement of the Supply Side Sub Base

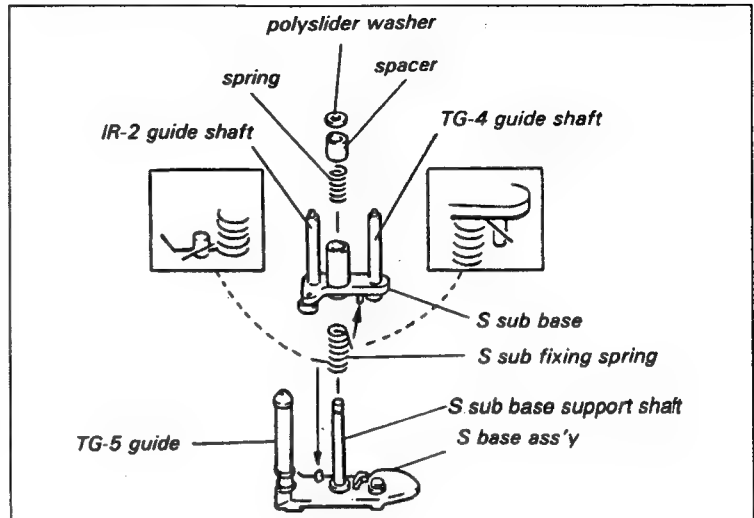
- The TG-4 and IR-2 Guides are provided on the S Sub Base. When replacing the S Sub Base, replace the TG-4 and IR-2 Guides referring to Sections 4-22-1 and 4-22-3. Then, adjust the height with the TG-5 Guide as reference.

Tool: Tape guide adjustment screwdriver

Mode: EJECT

Replacement procedure:

- (1) Remove the polyslider washer at the top of the S Sub Base.
- (2) Remove the spacer, compression spring, S Sub Base on which TG-4 and IR-2 Guide are installed, and S Sub Fixing Spring.
- (3) Clean the new S Sub Base TG-4 Guide Shaft and IR-2 Guide Shaft with a cleaning piece moistened with cleaning fluid.
- (4) Remove the TG-4 Guide Roller and IR-2 Impedance Roller from the S Sub Base removed in Step (2) and install them on the new S Sub Base.
- (5) Clean the S Sub Base Support Shaft with a cleaning piece moistened with cleaning fluid.
- (6) Insert the S Sub Fixing Spring, S Sub Base (assembled in Step (4)), compression spring, and spacer onto the S Sub Base Support Shaft.
- (7) Hook the S Sub Fixing Spring as shown in the figure.
- (8) Insert the polyslider washer (1.5mm dia.) onto the top of the S Sub Base Shaft and fasten the S Sub Base.
- (9) Adjust the height of the TG-4 and IR-2 Guides with the TG-5 Guide as reference. (Refer to Sections 4-22-1 and 4-22-3).
- (10) After replacement, perform the adjustments in Section 4-42.



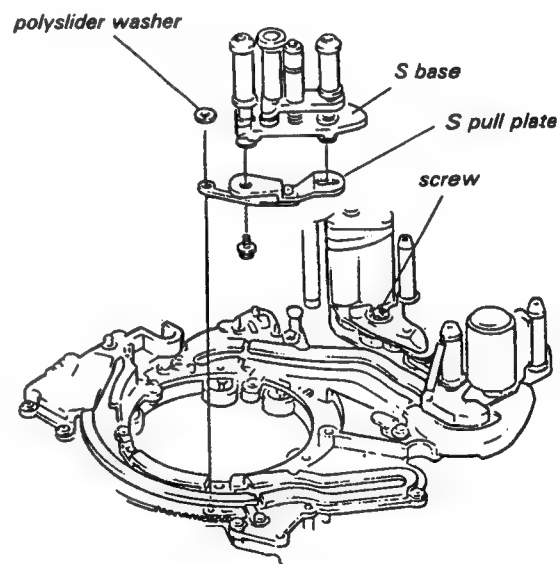
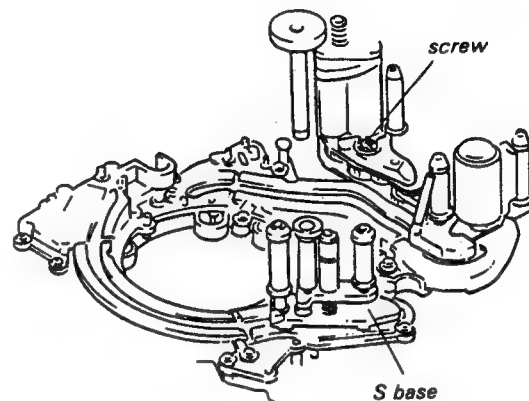
4-22-5. Replacement of the Component Parts of the Supply Side Base

- Refer to the appropriate section for replacing the TG-4, TG-5, and IR-2 Guides on the S Base.
- When replacing the components other than the above components on the S Base, remove the Drum Assembly from the unit so as not to damage it.

Mode: Turn the screw shown in the figure so that the S Side base reaches the end of the S Side rail.

Replacement procedure:

- (1) Remove the Drum Assembly from the unit. (Refer to Section 4-6).
- (2) Turn the screw and set the S Side Base in the position described above.
- (3) Remove the S Side Rail (I). (Refer to Section 4-32).
- (4) Remove the polyslider washer fixing the Supply Side Pull Plate and remove the S Side Base from the unit.
- (5) Replace the faulty component which constitutes the S Side base.
- (6) Assemble the S Side Base by reversing the Steps (1) through (4).
- (7) After replacement, perform the adjustments in Section 4-42.



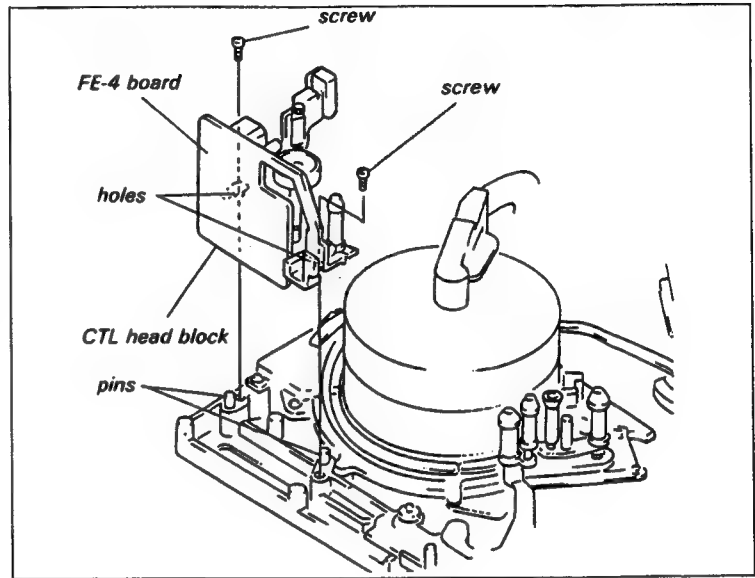
4-23. REPLACEMENT OF THE CTL HEAD BLOCK

- The CTL Head Block consists of the CTL Head, Erase Head, FE-4 Board, IR-1 Guide (impedance roller guide), and tape guide. Replacement of the above components is described below.
- When replacing the CTL Head, Erase Head, and FE-4 Board, remove the CTL Head Block from the unit. The removal and installation are described below.

Mode: EJECT

Removal and Installation:

- Remove the two fixing screws of the CTL Head Block and remove the CTL Head Block from the unit. When removing, raise the CTL Head Block connector CN43 at the lower portion of the FE-4 Board which is connected into the mother board (MB-440/440P Board).
- Install the CTL Head Block on the chassis with the two screws so that the two pins of the chassis are inserted into the CTL Head Block holes.

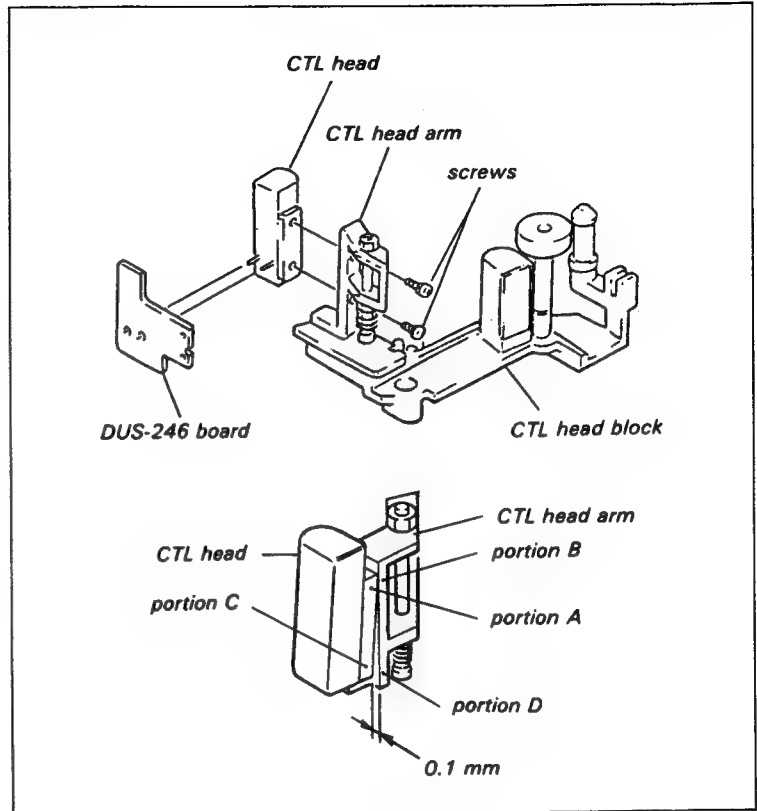


4-23-1. Replacement of the CTL Head

Mode: EJECT

Replacement procedure:

- (1) Remove the CTL Head Block from the unit.
- (2) Unsolder the DUS-246 Board which is mounted onto the CTL Head.
- (3) Remove the two screws of the CTL Head Arm and remove the CTL Head.
- (4) Install the new CTL Head to the CTL Head Arm with two screws snugly but do not tighten.
- (5) Adjust the CTL Head position so that the surface of the CTL Head Bracket's upper end (portion A in the figure) is the same plane as that of the CTL Head Arm's upper end (portion B), and the CTL Head Bracket's lower end (portion C) is shifted by 0.1 mm with respect to CTL Head Arm's lower end (portion D) as shown in the figure. Then, tighten the two fixing screws.
(Tightening torque: $0.3 \pm 0.05 \text{ N} \cdot \text{m}$ ($3 \pm 0.5 \text{ kg} \cdot \text{cm}$))
- (6) Solder the DUS-246 Board removed in Step (2).
- (7) Install the CTL Head Block on the unit.
- (8) After replacement, perform the adjustments in Section 4-42.

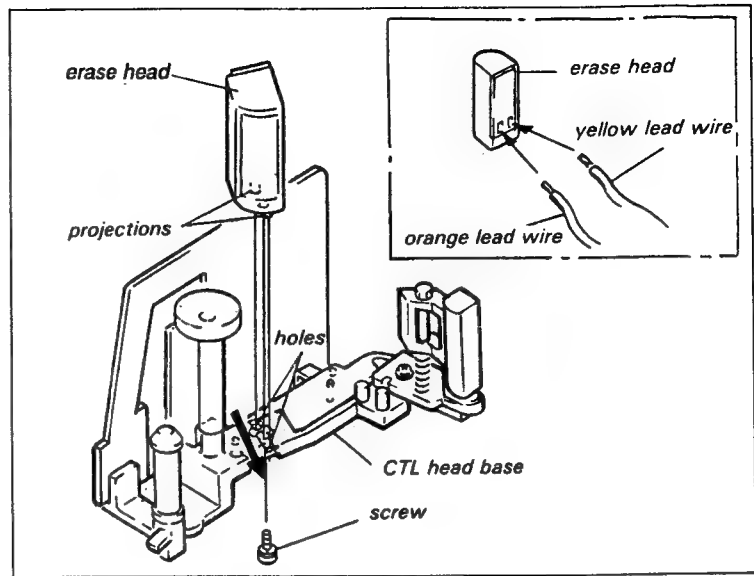


4-23-2. Replacement of the Erase Head

Mode: EJECT

Replacement procedure:

- (1) Remove the CTL Head Block from the unit.
- (2) Remove a screw from the lower side of the CTL Head Block and remove the Erase Head.
- (3) Unsolder the two lead wires of the Erase Head.
- (4) Solder two lead wires onto the new Erase Head.
(When viewed from the back of the head, the yellow lead wire is located on the right, and the orange on the left.)
- (5) Insert the two projections at the lower portion of the head into the holes of the CTL Head Base, and tighten the fixing screw while pushing it in the direction of the arrow.
- (6) Install the CTL Head Block on the unit.
- (7) After replacement, perform the adjustment in Section 4-42.

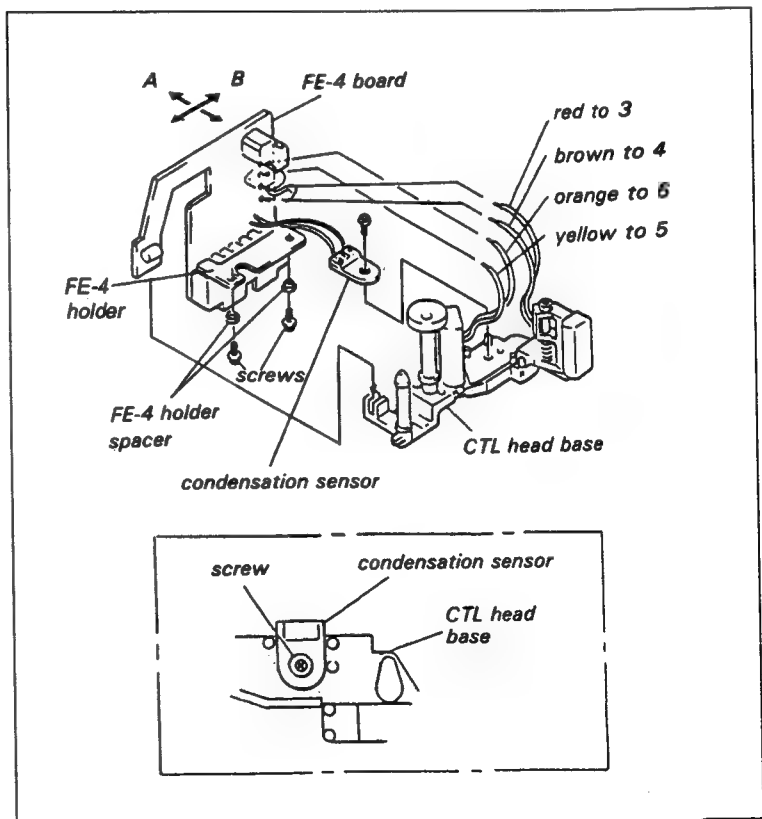


4-23-3. Replacement of the FE-4 Board

Mode: EJECT

Replacement procedure:

- (1) Remove the CTL Head Block from the unit.
- (2) Remove the condensation sensor which is attached to the CTL Head Base.
- (3) Remove the two screws from the lower side of the CTL Head Block and remove the FE-4 Board. The FE-4 Holder Spacers are inserted between the FE-4 Holder and screw. Be sure not to lose them.
- (4) Unsolder the four lead wires on the FE-4 Board.
- (5) Solder the lead wire removed in Step (4) onto the new FE-4 Board. (The brown lead wire is to 4, the red to 3, the orange to 6, and the yellow to 5.)
- (6) Install the Condensation sensor removed in Step (2) in the position shown in the figure.
- (7) Pass the FE-4 Holder Spacer through the screw in the direction as shown in the figure and install the FE-4 Board on the CTL Head Base.
- (8) Check that the FE-4 Board is slightly shifted in the direction of the arrows A and B.
- (9) Install the CTL Head Block on the unit.
- (10) After replacement, perform the adjustment in Section 4-42.



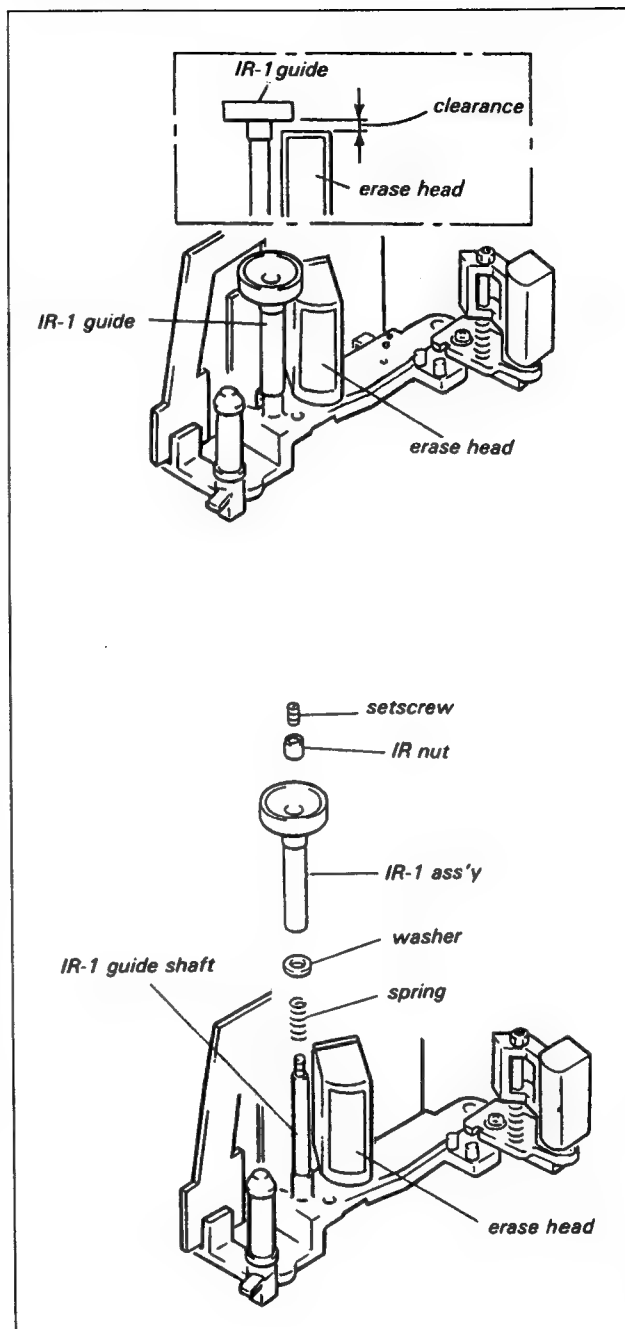
4-23-4. Replacement of the IR-1 Guide (Impedance Roller Guide)

Tool: Thickness gauge
Tape guide adjustment screwdriver

Mode: EJECT

Replacement procedure:

- (1) Measure the clearance between the lower surface of the IR-1 Guide's Upper Flange and Erase Head with the thickness gauge. (The clearance should be memorized.)
- (2) Loosen the setscrew at the top of the IR-1 Guide with the tape guide adjustment screwdriver.
- (3) Remove the IR Nut.
- (4) Remove the IR-1 Assembly, washer (1.4mm dia.), and compression spring from the IR-1 Guide Shaft.
- (5) Clean the IR-1 Guide Shaft with a cleaning piece moistened with cleaning fluid.
- (6) Install the compression spring and washer (1.4mm dia.) removed in Step (4) onto the IR-1 Guide Shaft.
- (7) Carefully insert the new IR-1 Assembly onto the IR-1 Guide Shaft.
- (8) Install the IR Nut.
- (9) Adjust the height of the IR-1 Guide using the IR Nut so that the clearance between the lower surface of the IR-1 Guide's Upper Flange and the Erase Head is the same as the clearance measured in Step (1).
- (10) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
- (11) Recheck the clearance between the lower surface of the IR-1 Guide's Upper Flange and the Erase Head. When the clearance does not meet the required specification, repeat Steps (9) and (10).
- (12) After replacement, perform the adjustment in Section 4-42.



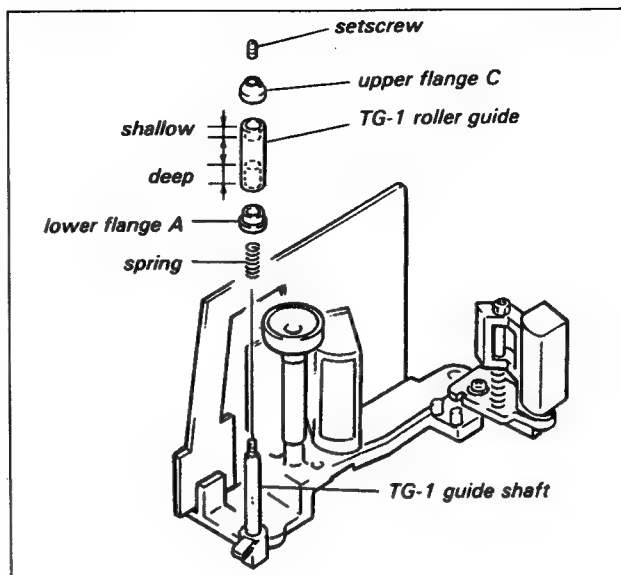
4-24. REPLACEMENT OF THE TG-1

Tool: Tape guide adjustment screwdriver

Mode: EJECT

Replacement procedure:

- (1) Loosen the setscrew at the top of the TG-1 with the tape guide adjustment screwdriver.
- (2) Remove the Upper Flange C.
- (3) Remove the TG-1 Roller Guide, Lower Flange A, and the compression spring.
- (4) Clean the TG-1 Guide Shaft with a cleaning piece moistened with cleaning fluid.
- (5) Insert the compression spring removed in Step (3) onto the TG-1 Guide Shaft.
- (6) Carefully insert the Lower Flange A and the TG-1 Roller Guide onto the TG-1 Guide Shaft in the direction as shown in the figure.
- (7) Install the Upper Flange C.
- (8) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
- (9) After replacement, perform the adjustment in Section 4-42.



4-25. REPLACEMENT OF THE A/T HEAD

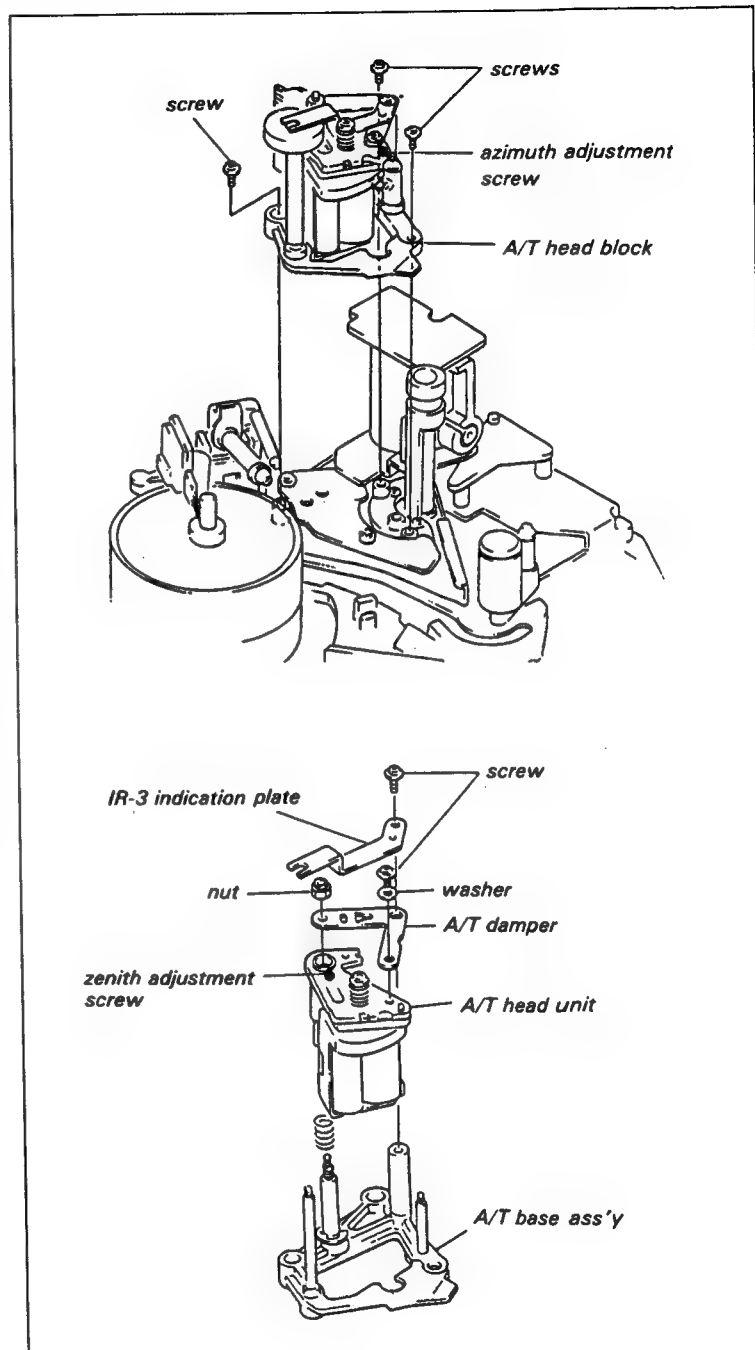
- When replacing the A/T Head, be careful not to loosen or tighten the azimuth adjustment screw and zenith adjustment screw shown in the figure.

Tool: Plate parallel
Thickness gauge
Tweezers
Flatness check tool

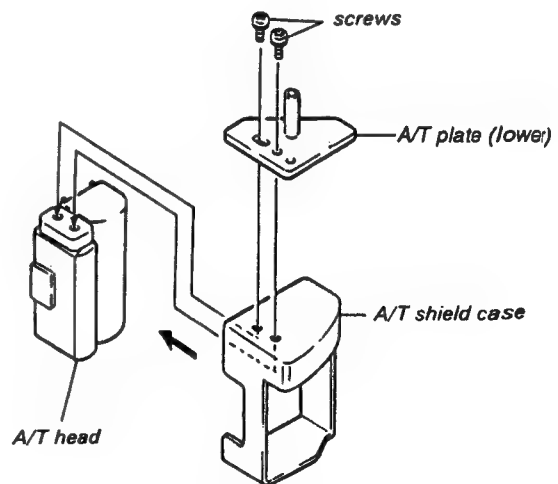
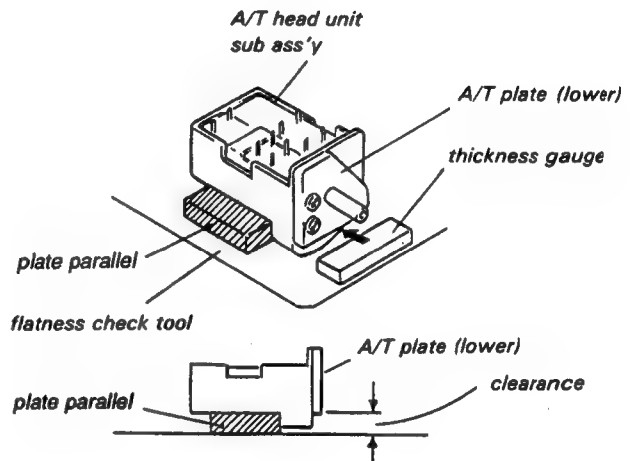
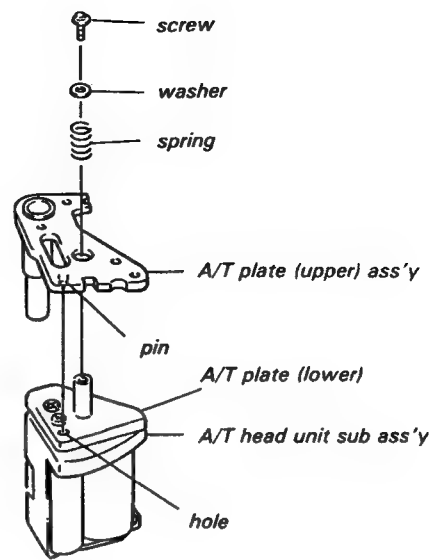
Mode: EJECT

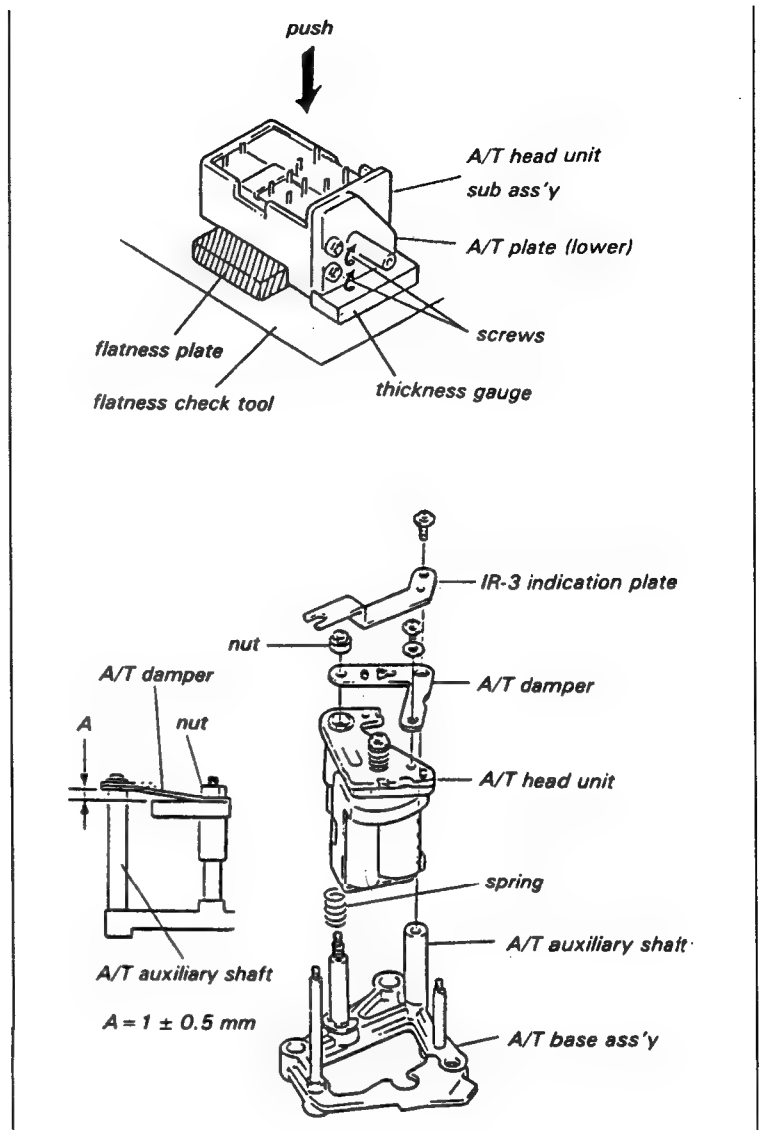
Replacement procedure:

- (1) Remove the flexible board (FL-55/55P Board) of the A/T Head Block which is connected to connectors CN3 and CN7 on the TB-5 Board with the tweezers. (Refer to Section 3-9).
- (2) Remove the three fixing screws of the A/T Head Block and remove the A/T Head Block from the unit. Be careful not to damage the flexible board (FL-55 Board).
- (3) Unsolder the ten terminals the FL-55/55P Board which is soldered to the A/T Head and remove the FL-55/55P Board from the A/T Head Block.
- (4) Remove the two screws and one nut shown in the figure, then remove the A/T Head Unit from the A/T Head Block.
- (5) Remove the screw located in the center of the A/T Head Unit and remove the A/T Head Unit Sub Assembly from the A/T Plate (Upper) Assembly.
- (6) As shown in the figure, put the flatness plate on the flatness check tool and place the A/T Head Unit Sub Assembly (removed in Step (5)) on it.
- (7) Check the clearance between the flatness check tool and the edge of the A/T Plate (Lower) with the thickness gauge.



- (8) Remove the two screws shown in the figure, remove the A/T Head and A/T Shield Case from the A/T Plate (Lower), and replace the new A/T Head. Thread the two screws on the head snugly but do not tighten.
- (9) Put the A/T Head Unit Sub Assembly on the flatness check tool as in Step (6) and insert the thickness gauge checked in Step (7) between the A/T Plate (Lower) and flatness check tool.
- (10) Tighten the two A/T Head fixing screws while pushing the A/T Head and A/T Plate (Lower) toward the flatness check tool.
(NOTE) Be careful not to damage the head.
- (11) Install the A/T Head Unit Sub Assembly on the A/T Plate (Upper) Assembly by reversing the Step (5). Check that the pin of the A/T Plate (Upper) Assembly is inserted into the hole of the A/T Plate (Lower).
- (12) Install the A/T Head Unit on the A/T Base Assembly. As shown in the figure, adjust the nut so that clearance A (See next page) between the tip of the A/T Auxiliary Shaft and A/T Plate (Upper) Assembly meets the required specification as viewed.
- (13) Assemble the A/T Head Block in the unit by reversing the Steps (1) through (3).
- (14) After replacement, perform the adjustment in Section 4-42.





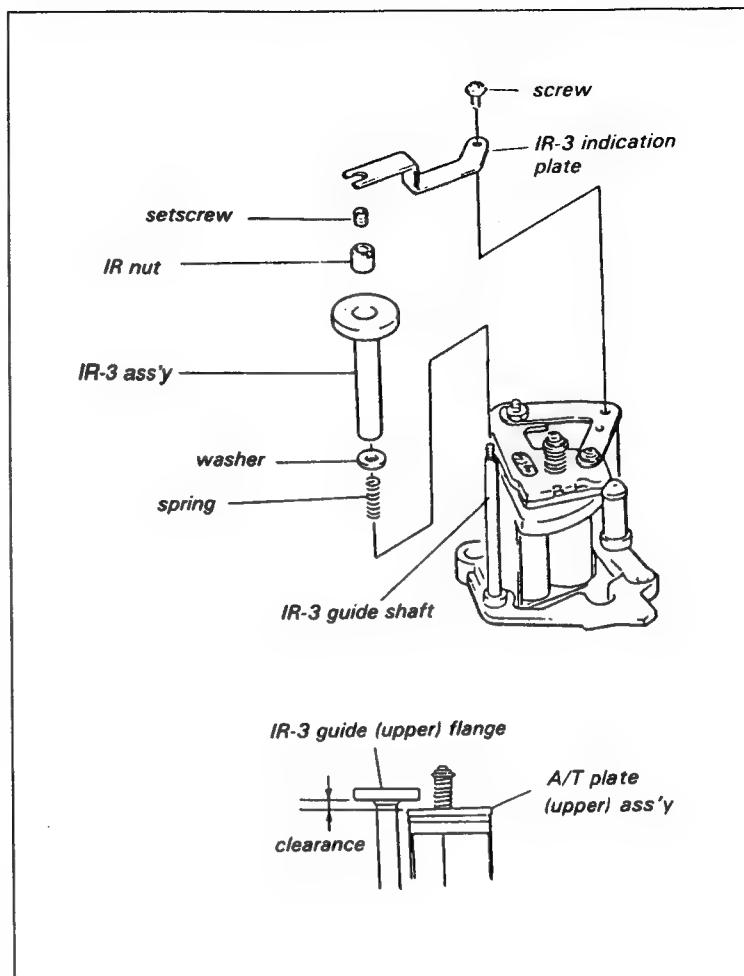
4-26. REPLACEMENT OF THE IR-3 GUIDE (IMPEDANCE ROLLER GUIDE)

Tool: Thickness gauge
Tape guide adjustment screwdriver

Mode: EJECT

Replacement procedure:

- (1) Measure the clearance between the lower surface of an IR-3 Guide's Upper Flange and the A/T Plate (Upper) Assembly with the thickness gauge.
(The clearance should be memorized.)
- (2) Remove the screw and remove the IR-3 Supporting Plate.
- (3) Loosen the setscrew at the top of the IR-3 Guide with the tape guide adjustment screwdriver.
- (4) Remove the IR nut.
- (5) Remove an IR-3 Assembly, washer (1.4mm dia.), and compression spring from the IR-3 Guide Shaft.
- (6) Clean the IR-3 Guide Shaft with a cleaning piece moistened with cleaning fluid.
- (7) Install the compression spring and washer (1.4mm dia.) removed in Step (5) onto the IR-3 Guide Shaft.
- (8) Carefully insert the new IR-3 Assembly onto the IR-3 Guide Shaft.
- (9) Install the IR Nut.
- (10) Adjust the height of the IR-3 Guide using the IR Nut so that the clearance between the lower surface of the IR-3 Guide's Upper Flange and the A/T Plate (Upper) Assembly is the same as the clearance measured in Step (1).
- (11) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
- (12) Recheck the clearance between the lower surface of the IR-3 Guide's Upper Flange and the A/T Plate (Upper) Assembly. When the clearance does not meet the required specification, repeat Steps (10) and (11).
- (13) After replacement, perform the adjustments in Section 4-42.



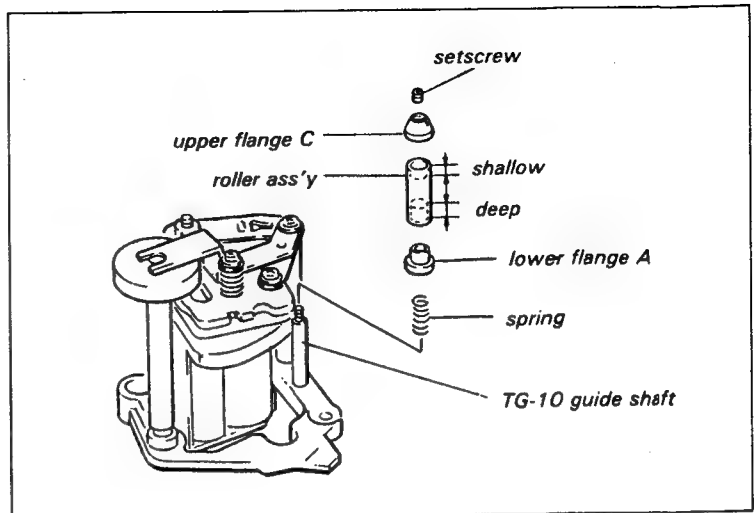
4-27. REPLACEMENT OF THE TG-10

Tool: Tape guide adjustment screwdriver

Mode: EJECT

Replacement procedure:

- (1) Loosen the setscrew at the top of the TG-10 with the tape guide adjustment screwdriver.
- (2) Remove the Upper Flange C.
- (3) Remove the Roller Assembly, Lower Flange A, and the compression spring.
- (4) Clean the TG-10 Guide Shaft with a cleaning piece moistened with cleaning fluid.
- (5) Insert the compression spring removed in Step (3) onto the TG-5 Guide Shaft.
- (6) Carefully insert the Lower Flange A and the Roller Assembly onto TG-10 Guide Shaft in the direction shown in the figure.
- (7) Install the Upper Flange C.
- (8) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
- (9) After replacement, perform the adjustments in Section 4-42.



4-28. REPLACEMENT OF THE COMPONENT PARTS OF THE TAKE-UP SIDE SUB BASE

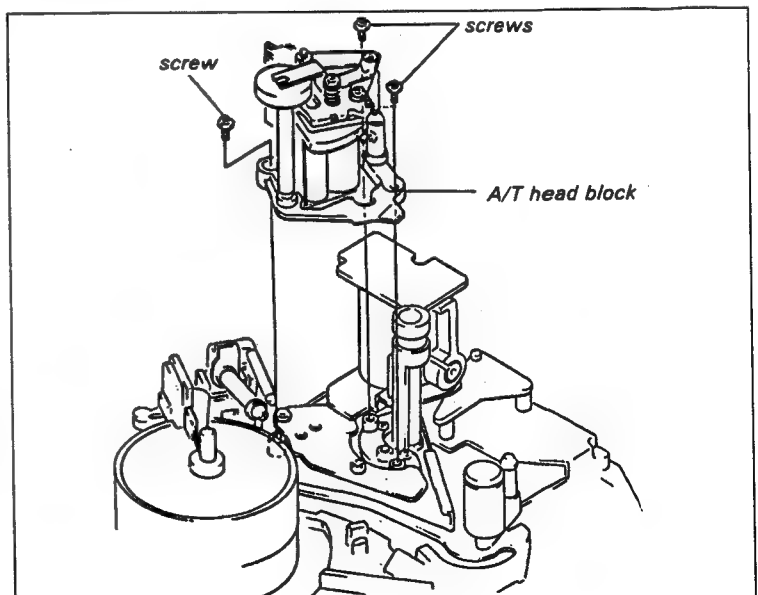
- The T Sub Base Block consists of the TG-8 and the Slant Guide. Replacement of the above components is described below.
- When replacing the above components, remove the A/T Head Block from the unit. The removal and installation procedures are described below.

Tool: Tweezers

Mode: EJECT

Removal and Installation Procedures:

- Remove the flexible board (FL-55/55P Board) of the A/T Head Block which is connected to connectors CN3 and CN7 on the TB-5 Board with the tweezers. (Refer to Section 3-9.)
- Remove the three fixing screws of the A/T Head Block and remove the A/T Head Block from the unit. Be careful not to damage the flexible board (FL-55/55P Board) and A/T Head.
- Install by reversing the above.
- When replacing the component of the T Sub Base, not to remove the frame of the T Sub Base (T Sub Rotation Table) and T Sub Adjustment Plate from the unit.



4-28-1. Replacement of the TG-8

- TG-8 is the component part of the T Sub Base Block.

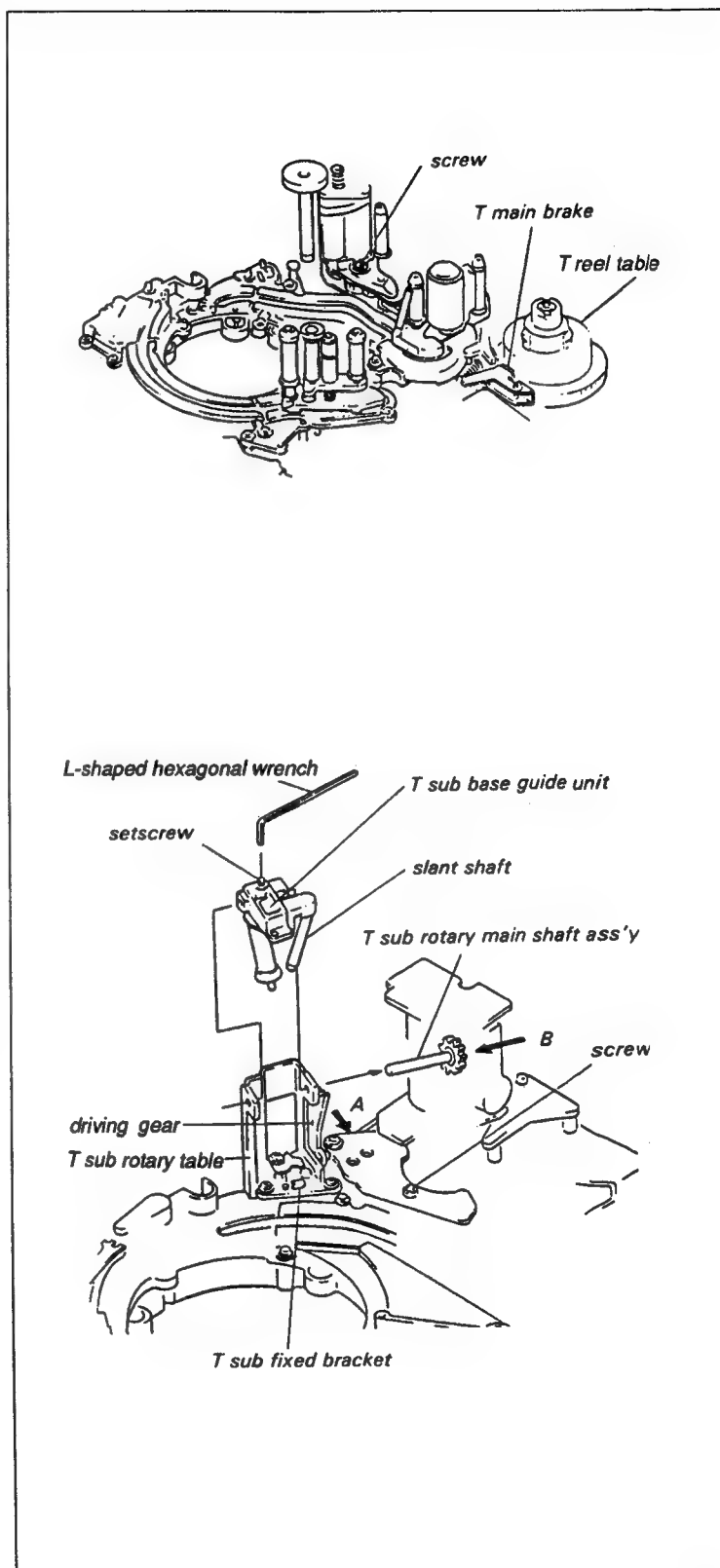
Tool: L-shaped hexagonal wrench (across flat has 0.89mm.)

Tension gauge (50g full scale)

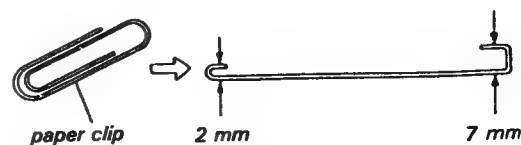
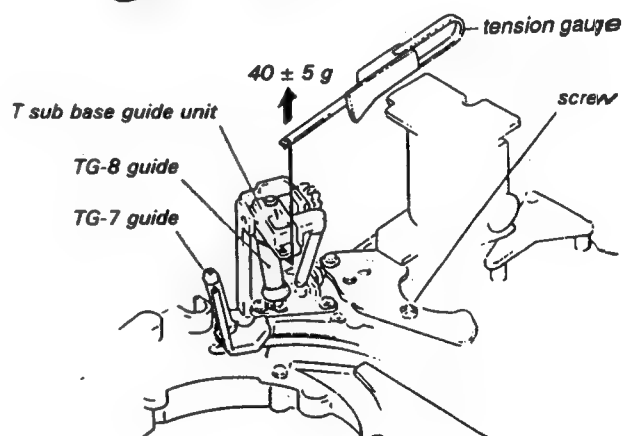
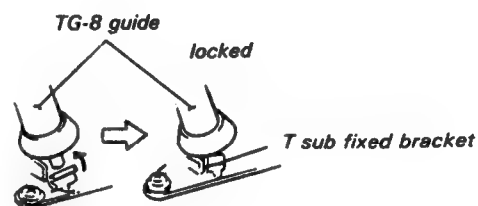
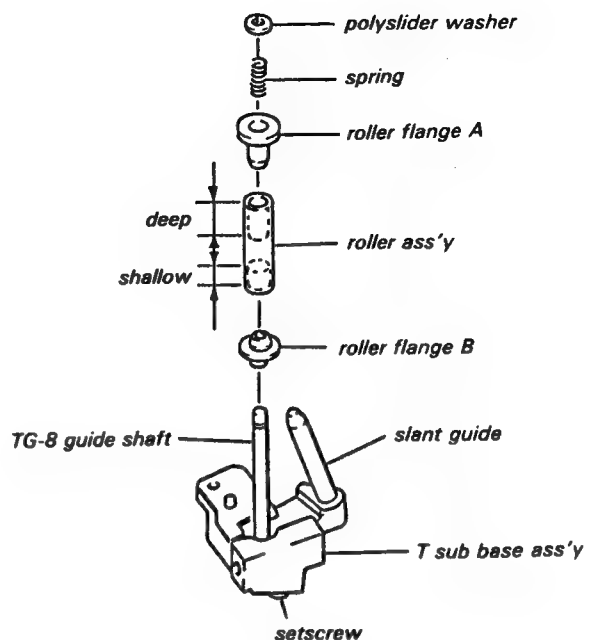
Mode: EJECT → Threading end → EJECT

Replacement procedure:

- (1) Turn the screw clockwise until each of the tape guides are at position of the threading end as shown in the figure. Keep turning clockwise until the T Main Brake is pressed against the T Reel.
- (2) Remove the A/T Head Block from the unit.
- (3) Loosen the setscrew at the top of the T Sub Base by turning two or three times with the L-shaped hexagonal wrench.
- (4) Pull the T Sub Rotary Main Shaft Assembly to the A/T head side. Then the T Sub Base Guide Unit can be removed.
- (5) Remove the polyslider washer from the top of the TG-8 Guide.
- (6) Remove the compression spring, Roller Flange A, Roller Assembly (TG-8), and Roller Flange B from the TG-8 Guide Shaft.
- (7) Clean the TG-8 Guide Shaft with a cleaning piece moistened with cleaning fluid.
- (8) Carefully insert the Roller Flange B, Roller Assembly (TG-8), and Roller Flange A onto the TG-8 Guide Shaft in the direction as shown in the figure.
- (9) Insert the compression spring onto the TG-8 Guide Shaft, then push the 1.2mm diameter polyslider washer on the shaft.
- (10) Install the assembled T Sub Base Guide Unit onto the T Sub Rotary Table with the T Sub Rotary Main Shaft assembly. (Do not tighten the setscrew too much.)



- (11) Slowly turn the screws mentioned in Steps (1) counterclockwise until the T Sub Fixed Bracket touches the T Sub Rotary Table. (At that time, do not move the Driving Gear of the T Sub Rotary Table.)
- (12) Push the top edge of the TG-8 Guide Shaft onto the T Sub Rotary Table side (the opposite side to the drum).
- (13) Turn the screws clockwise until the T Main Brake is pressed against the T Reel Table as described in Step (1).
- (14) While pushing the Driving Gear in the direction of the arrow A and T Sub Rotary Main Shaft Assembly in the direction of the arrow B, tighten the setscrew.
- (15) Turn the screw described in Step (1) so that the top edge of the TG-8 is locked by the T Sub Fixed Bracket.
- (16) Reform the small paper clip as shown in the figure.
- (17) Insert the reformed paper clip into the hole of the T Sub Base Guide Unit and hang the tension gauge on the other end.
- (18) Move the tension gauge in the upward direction to the unit until it shows 40 ± 5 g. (Never applied 50g or more.)
- (19) Turn the screw described in Step (1) clockwise, and check that the top edge of the TG-8 Guide is firmly locked by the T Sub Fixed Bracket. When threading or unthreading check that the TG-8 Guide Roller and the TG-7 Guide are not touching. If the specification is not satisfied, perform the Step (14) again. At that time, change the degree of pressure a little when pushing in the direction of arrow A.



4-28-2. Replacement of the Slant Guide

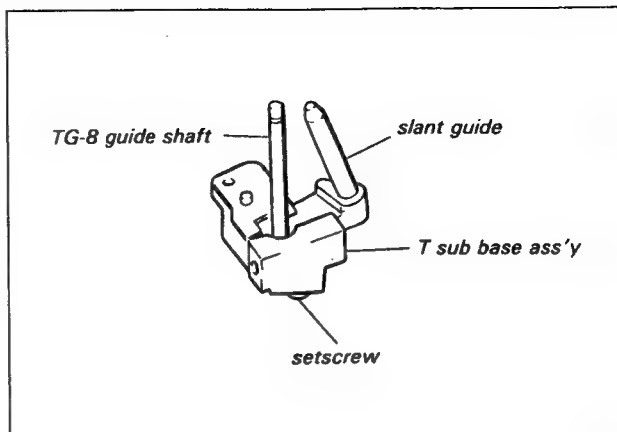
- The Slant Guide is the component part of the T Sub Base Block.

Tool: L-shaped hexagonal wrench (across flat has 0.89mm dia.)

Mode: EJECT → Threading end → EJECT

Replacement procedure:

- (1) The same as in Steps (1) through (6) of Section 4-28-1.
- (2) Remove the setscrew from the removed T Sub Base Assembly and install it on the new T Sub Base Assembly.
- (3) Clean the TG-8 Guide Shaft of the T Sub Base Assembly and Slant Guide with a cleaning piece moistened with cleaning fluid.
- (4) Assemble as described in Steps (8) through (19) of Section 4-28-1.
- (5) After replacement, perform the adjustments in Section 4-42.



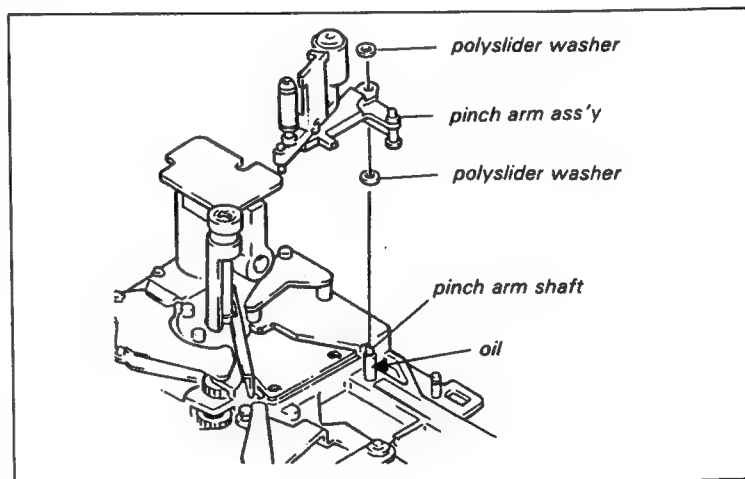
4-29. REPLACEMENT OF THE PINCH ARM ASSEMBLY

Tool: Tweezers

Mode: EJECT

Replacement procedure:

- (1) Remove the Pinch Arm Lock Lever from the unit. (Refer to Section 4-19.)
- (2) Remove the polyslider washer fixing the Pinch Arm Assembly and remove the assembly from the unit.
- (3) Clean the Pinch Arm Shaft with a cleaning piece moistened with cleaning fluid.
- (4) Apply an 1/4 drop of Sony oil on the Pinch Arm Shaft.
- (5) Install the new Pinch Arm Assembly.
- (6) Insert the polyslider washer (1.2mm dia.) onto the shaft and fasten the Pinch Arm Assembly.
- (7) Install the Pinch Arm Lock Lever. (Refer to Section 4-19.)
- (8) After replacement, perform the adjustment in Section 4-42.



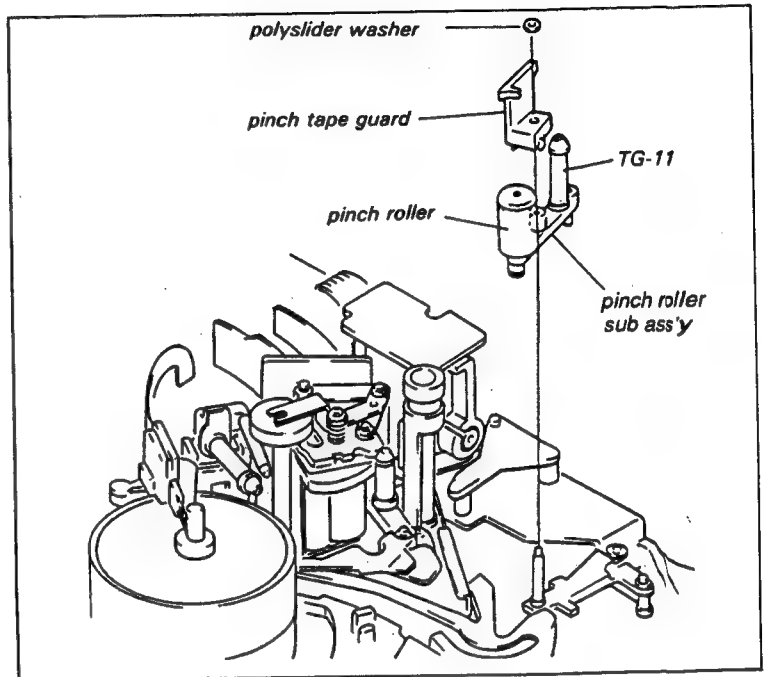
4-30. REPLACEMENT OF THE PINCH ROLLER SUB ASSEMBLY

- The TG-11 Guide is installed on the shaft of the Pinch Roller sub Assembly.
- When replacing the Pinch Roller Sub Assembly, the TG-11 Guide must be replaced at the same time.
(Refer to Section 4-31.)

Mode: EJECT

Replacement procedure:

- (1) Remove the polyslider washer fixing the Pinch Roller Sub Assembly onto the Pinch Arm Assembly.
- (2) Remove the Pinch Tape Guard and the Pinch Roller Sub Assembly from the unit.
- (3) Install the TG-11 Guide of the old Pinch Roller Sub Assembly onto the new Pinch Roller Sub Assembly as described in Section 4-31.
- (4) After installing the Pinch Roller Sub Assembly and the Pinch Tape Guard on the Pinch Arm Assembly, push a polyslider washer onto the shaft.
- (5) Clean the pinch roller with a cleaning piece moistened with cleaning fluid.



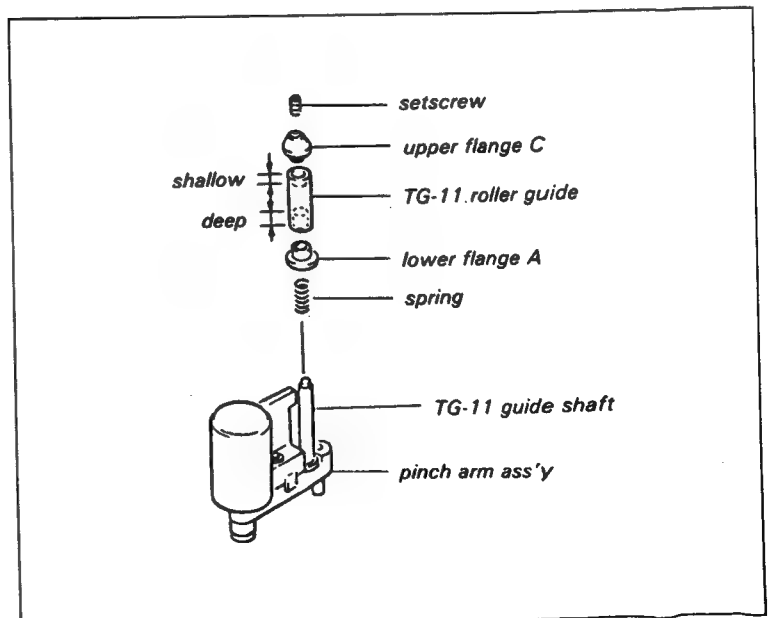
4-31. REPLACEMENT OF THE TG-11

Tool: Tape guide adjustment screwdriver

Mode: EJECT

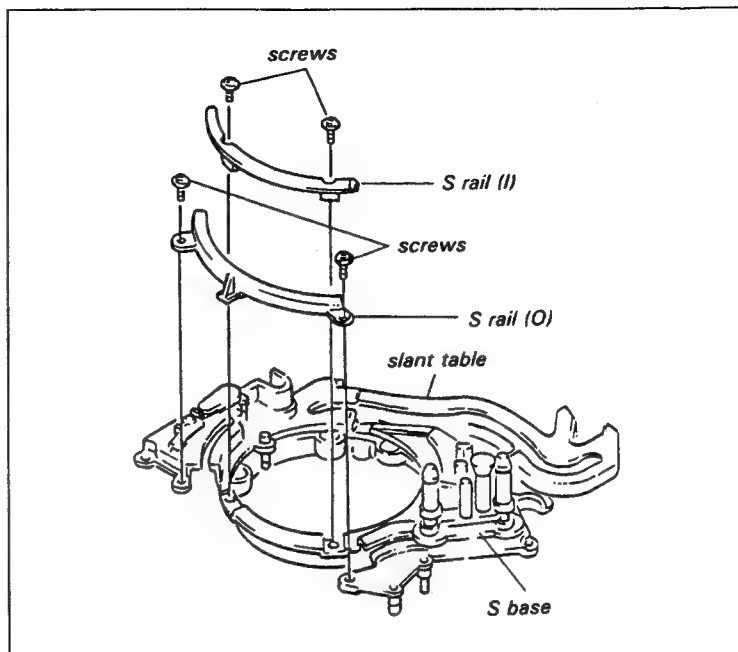
Replacement procedure:

- (1) Loosen the setscrew at the top of the TG-11 with the tape guide adjustment screwdriver.
- (2) Remove the Upper Flange C.
- (3) Remove the TG-11 Roller Guide, Lower Flange A, and the compression spring.
- (4) Clean the TG-11 Guide Shaft with a cleaning piece moistened with cleaning fluid.
- (5) Insert the compression spring removed in Step (3) onto the TG-11 Shaft.
- (6) Carefully insert the Lower Flange A and the TG-11 Roller Guide onto the TG-11 Guide Shaft in the direction as shown in the figure.
- (7) Install the Lower Flange C.
- (8) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
- (9) After replacement, perform the adjustment in Section 4-42.



4-32. REPLACEMENT OF THE SUPPLY SIDE RAIL (I)**Mode:** EJECT**Replacement procedure:**

- (1) Remove the Drum Assembly from the unit.
(Refer to Section 4-6.)
- (2) Remove the two screws on the S Rail (I) and remove it from the unit.
- (3) Install the new S Rail (I) on the unit so that the clearance between the new S Rail (I) and S Rail (O) is 3.1 to 3.4mm.
- (4) Repeat threading and unthreading two or three times and check that they can be done smoothly.
- (5) Install the Drum Assembly on the unit.
- (6) After replacement, perform the adjustments in Section 4-42.

**4-33. REPLACEMENT OF THE SUPPLY SIDE RAIL (O)****Mode:** EJECT**Replacement procedure:**

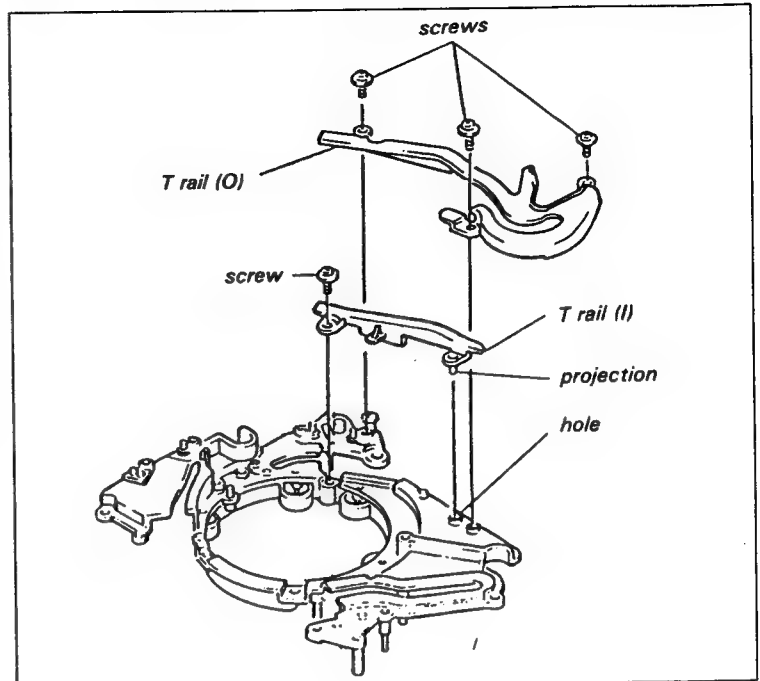
- (1) Remove the two screws of the S Rail (O) and remove it from the unit.
- (2) Install a new S rail (O) on the unit so that the clearance between the new S Rail (O) and S Rail (I) is 3.1 to 3.4mm.
- (3) Repeat threading and unthreading two or three times and check that they can be done smoothly.

4-34. PLACEMENT OF THE TAKE-UP SIDE RAIL (I)

Mode: Threading end

Replacement procedure:

- (1) Remove the Drum Assembly from the unit.
(Refer to Section 4-6.)
- (2) Remove a fixing screw on the T Rail (I) and remove it from the unit.
- (3) Install the new T Rail (I) so that its projection is inserted into the chassis hole and the clearance between the new T Rail (I) and T Rail (O) is 3.1mm to 3.5mm.
- (4) Repeat threading and unthreading two or three times and check that they can be done smoothly.
- (5) Install the Drum Assembly on the unit.
- (6) After replacement, perform the adjustments in Section 4-42.



4-35. REPLACEMENT OF THE TAKE-UP SIDE RAIL(O)

Mode: Threading end

Replacement procedure:

- (1) Remove the three fixing screws of the T Rail (O) and remove it.
- (2) Install the new T Rail (O) on the unit so that the clearance between the new T Rail (O) and T Rail (I) is 3.1 to 3.5mm.
- (3) Repeat threading and unthreading two or three times and check that they can be done smoothly.

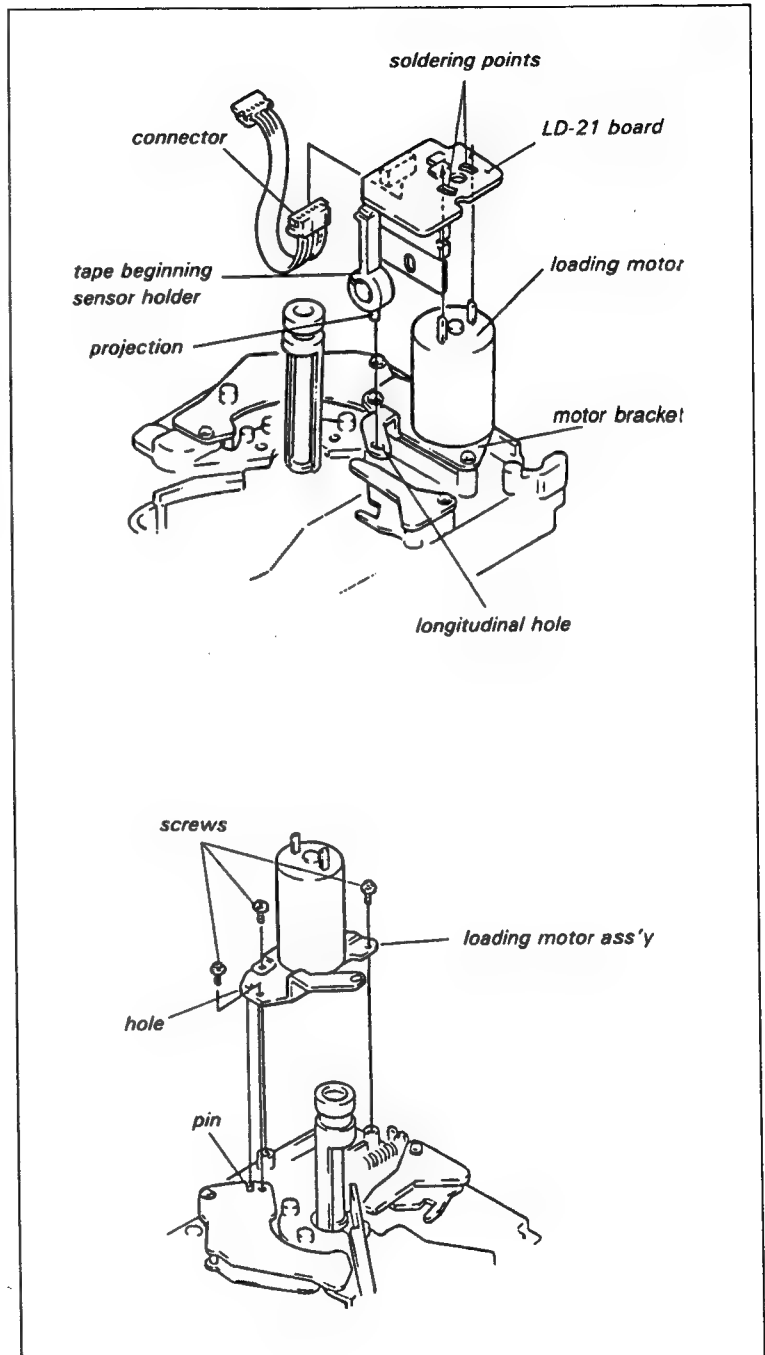
4-36. REPLACEMENT OF THE LOADING MOTOR

- When replacing the Loading Motor, replacement of the Loading Motor Assembly is recommended.

Mode: EJECT

Replacement procedure:

- (1) Remove the connector on the LD-21 Board of the upper portion of the Loading Motor.
- (2) Unsolder the two terminals, then remove the LD-21 Board from the Loading Motor.
- (3) Remove the three screws shown in the figure, then remove the Loading Motor Assembly from the unit.
- (4) After inserting the chassis pin into the hole of the new Loading Motor Assembly, install the Loading Motor Assembly, install the Loading Motor Assembly with the three fixing screws.
- (5) Assemble by reversing the Steps (1) and (2). When installing, make sure that the projection at the lower part of the Tape Beginning Sensor Holder on the LD-21 Board is in the longitudinal hole of the Motor Bracket.

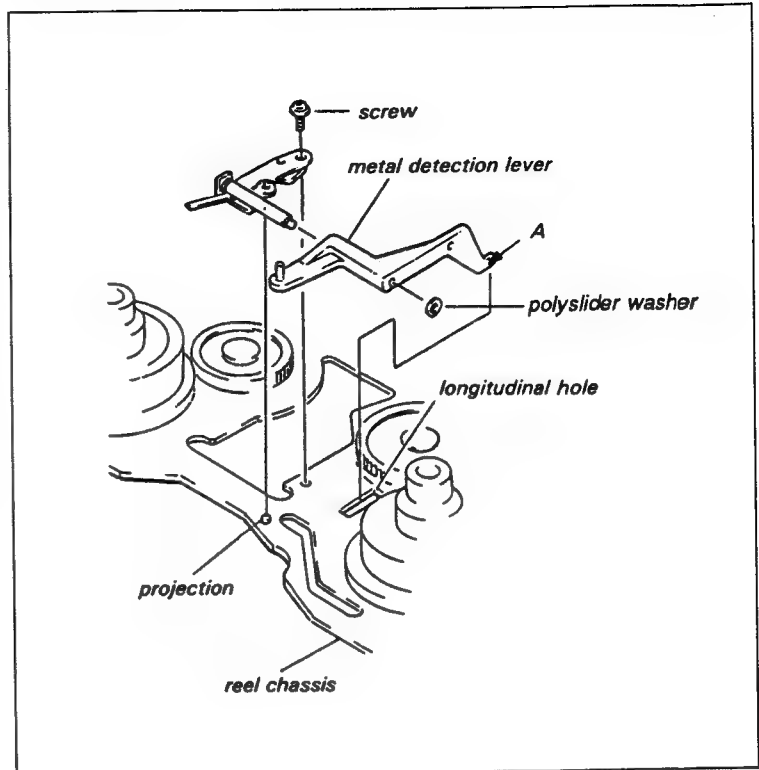


4-37. REPLACEMENT OF THE METAL DETECTION LEVER

Mode: EJECT

Replacement procedure:

- (1) Remove the Brake Slider referring to Section 4-17.
- (2) Remove a screw of the Metal Detection Lever and remove it from the unit.
- (3) Remove the polyslider washer of the Metal Detection Lever and replace it with a new one.
- (4) Install the Metal Detection Lever with the 1.2mm diameter polyslider washer.
- (5) Install the Metal Detection Lever on the chassis and fix it with the fixing screw so that portion A of the Metal Detection Lever is inserted into the longitudinal hole and the projection of the reel chassis is inserted into the hole of the Metal Detection Lever.
- (6) Install the Brake Slider referring to Section 4-17.



4-38. REPLACEMENT OF THE REEL SLIDER DRIVING GEAR

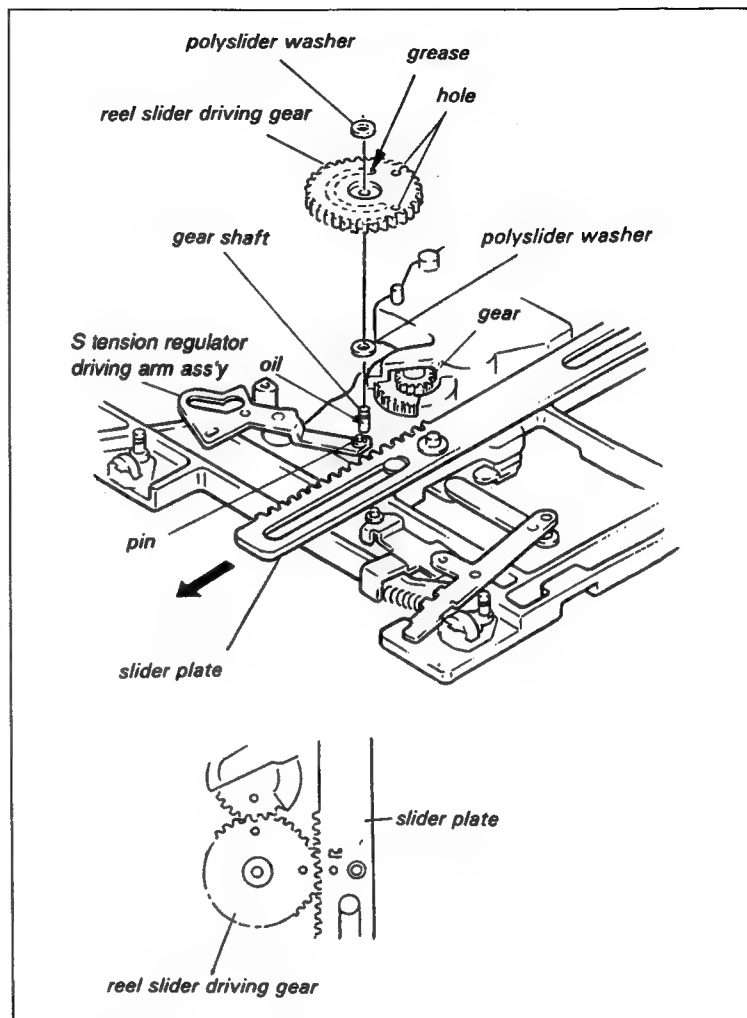
- When replacing this part, remove the Reel Chassis from the Mechanical Deck Block.
(Refer to Section 3-16.)

Tool: Sony grease
Sony oil

Mode: EJECT

Replacement procedure:

- (1) Remove the Reel Chassis. (Refer to Section 3-16.)
- (2) Remove the polyslider washer fixing the Reel Slider Driving Gear, then remove the Reel Slider Driving Gear and the polyslider washer (1.6mm dia.).
- (3) Clean the Gear Shaft with a cleaning piece moistened with cleaning fluid.
- (4) Install the polyslider washer (1.6mm dia.) on the shaft.
- (5) Apply an 1/4 drop of Sony oil on the shaft.
- (6) Smear a little Sony grease onto the groove of the new Reel Slider Driving Gear.
- (7) Move the Slider manually in the direction of the arrow until it stops.
- (8) Insert the Reel Slider Driving Gear into the shaft so that the pin of the S Tension Regulator Driving Arm Assembly is into the groove of the Driving Gear, and so that the positional relationship between the holes on the other gear and the slider plate and two holes of the Driving Gear as shown in the figure.
- (9) Push the polyslider washer (1.2mm dia.) onto the shaft and fasten the Reel Slider Driving Gear.
- (10) Install the Reel Chassis. (Refer to section 3-16.)



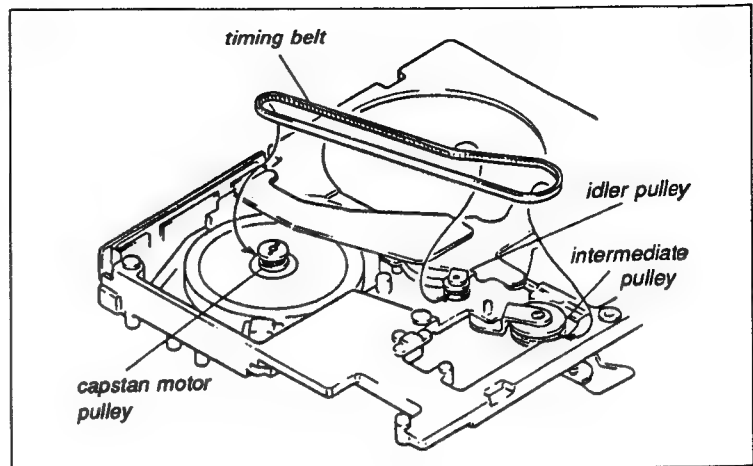
4-39. REPLACEMENT OF THE TIMING BELT

- When replacing this part, remove the Mechanical Deck Block from the unit. (Refer to Section 3-12.)

Mode: EJECT

Replacement procedure:

- (1) Remove the Mechanical Deck Block from the unit.
(Refer to Section 3-12.)
- (2) Remove the Timing Belt.
- (3) Place the new Timing Belt on the Capstan Motor Pulley, the Intermediate Pulley, then on the Idler Pulley in that order.



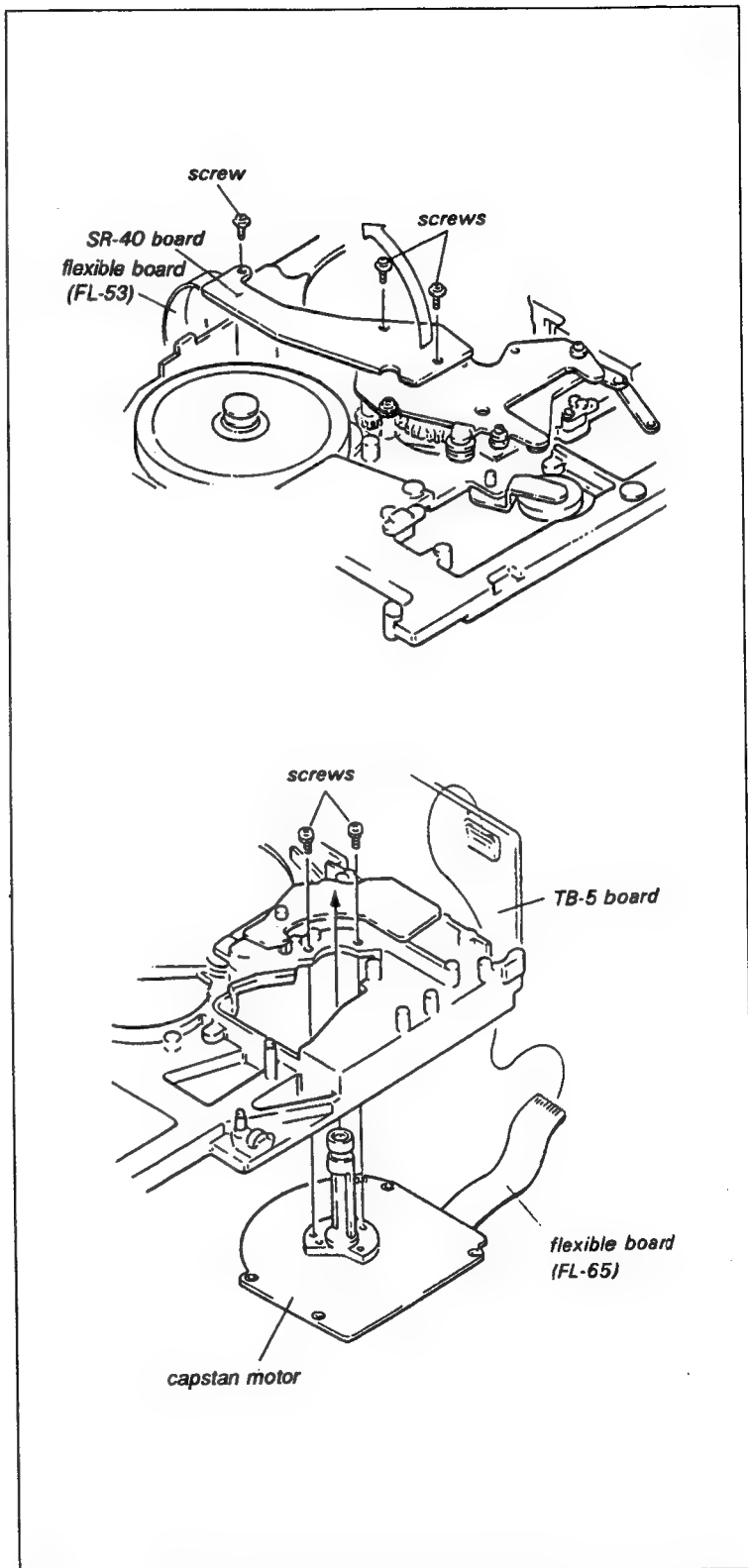
4-40. REPLACEMENT OF THE CAPSTAN MOTOR

- When replacing this part, remove the Mechanical Deck Block from the unit. (Refer to Section 3-12.)

Mode: EJECT

Replacement procedure:

- (1) Remove the Mechanical Deck Block from the unit.
(Refer to Section 3-12.)
- (2) Remove the three fixing screws of the SR-40 Board on the back of the Mechanical Deck Block and open the SR-40 Board on the flexible board side.
- (3) After removing flexible connector CN2 on the TB-5 Board from the front of the Mechanical Deck Block, remove the two fixing screws on the Capstan Motor, then remove the Capstan Motor from the unit.
- (4) Install the new Capstan Motor on the Mechanical Deck Block by reversing the Steps (1) through (3).
(NOTE) It is recommended for easy installing that the tip of the flexible board (FL-65 Board) makes flat.
- (5) Assemble by reversing the Step (2).

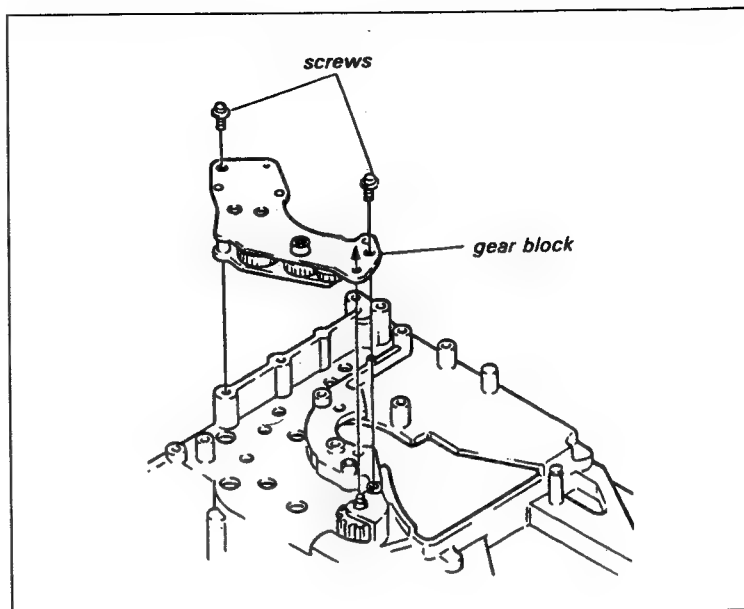


4-41. REPLACEMENT OF THE GEAR BLOCK

Mode: EJECT

Replacement procedure:

- (1) Remove the Loading Motor as described in Section 4-36, and remove the A/T Head Block as in Section 4-25.
- (2) Remove the two fixing screws as shown in the figure, remove the Gear Block, and replace with a new one.
- (3) Install the A/T Head Block and the Loading Motor Block as described in Sections 4-25 and 4-36.



4-42. ITEMS TO BE ADJUSTED AFTER THE MAIN PARTS REPLACEMENT

(Numbers in parenthesis refer to Section Nos.)

Replacement of the Upper Drum Assembly

Brush Position Adjustment (6-16) → Tracking Adjustment (6-8) → Tape Path Adjustment (PLAY mode)(6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (6-9) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12) → Audio Head Height Adjustment (6-13) → TC Head Position Adjustment (check)(6-12) → Audio Head Phase Adjustment (6-14) → PB Switching Position Adjustment (6-15) → Video System Adjustment (8-5)

Replacement of the Drum Assembly

Tracking Adjustment (6-8) → Tape Path Adjustment (PLAY mode)(6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (6-9) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12) → Audio Head Height Adjustment (6-13) → TC Head Position Adjustment (check)(6-12) → Audio Head Phase Adjustment (6-14) → PB Switching Position Adjustment (6-15) → Servo check (8-3) → Video System Adjustment (8-5)

Replacement of the S Reel Table

Tension Regulator Operating Position Adjustment (5-8) → PLAY Back Tension Adjustment (check)(6-4)

Replacement of the Tension Regulator Band

Tension Regulator Operating Position Adjustment (5-8) → PLAY Back Tension Adjustment (6-4)

Replacement of the Tension Regulator

Tension regulator Operation Position Adjustment (5-8) → Tape Path Adjustment (PLAY mode)(6-1) → Tape Path Check (FF, REW mode)(6-2) → PLAY Back Tension Adjustment (6-4) → Tracking Adjustment (check)(6-8)

Replacement of the TG-7

Threading Position Check (Take-up side)(5-6) → Tape Threading/Unthreading Check (6-3) → Tape Path Adjustment (PLAY mode)(6-1) → Tape Path Check (FF, REW mode)(6-2) → Tracking Adjustment (check)(6-8)

Replacement of the Component Parts of the T Base

Threading Position Check (Take-up side)(5-6) → Tape Threading/Unthreading Check (6-3) → Tape Path Adjustment (PLAY mode)(6-1) → Tape Path Check (FF, REW mode)(6-2) → Tracking Adjustment (6-8) → Tape Path adjustment (PLAY mode)(check)(6-1) → Tape Path check (FF, REW mode)(6-2) → CTL Head Height Adjustment (check)(6-9) → CTL Head Position Adjustment (check)(6-10) → TC Head Position Adjustment (6-12) → Audio Head Height Adjustment (6-13) → TC Head Position Adjustment (check)(6-12) → Audio Head Phase Adjustment (6-14) → PB Switching Position Adjustment (6-15)

Replacement of the TG-4

Threading Position Check (Supply side)(5-5) → Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check)(6-8) → Tape Path Adjustment (PLAY mode) (check)(6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (check)(6-9)

Replacement of the TG-5

Threading Position Check (Supply side)(5-5) → Tape Threading/Unthreading check (6-3) → Tracking Adjustment (6-8) → Tape Path Adjustment (PLAY mode)(check) (6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (check)(6-9)

Replacement of the IR-2

Threading Position Check (Supply side)(5-5) → Impedance Roller Guide II Clearance Adjustment (5-7) → Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check)(6-8) → Tape Path Adjustment (PLAY mode)(check) (6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (check)(6-9)

Replacement of the S Sub base

Threading Position Check (Supply side)(5-5) → Impedance Roller Guide II Clearance Adjustment (5-7) → Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check)(6-8) → Tape Path Adjustment (PLAY mode)(check) (6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (check)(6-9) → CTL Head Position Adjustment (check)(6-10) → TC Head Position Adjustment (check)(6-12)

Replacement of the Component Parts of the S Base

Threading Position Check (Supply side)(5-5) → Impedance Roller Guide 2 Clearance Adjustment (check)(5-7) → Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check)(6-8) → Tape Path adjustment (PLAY mode)(check) (6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (6-9) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12) → Audio Head Height Adjustment (6-13) → TC Head Position Adjustment (check)(6-12) → Audio Head Phase Adjustment (6-14) → PB Switching Position Adjustment (6-15)

Replacement of the CTL Head

Tracking Adjustment (check)(6-8) → Tape Path Adjustment (PLAY mode)(check) (6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (6-9) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12)

Replacement of the Erase Head and the FE-4 Board

Tracking Adjustment (check)(6-8) → Tape Path Adjustment (PLAY mode)(check) (6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12)

Replacement of the IR-1 Guide (Impedance Roller Guide), TG-1 Guide, IR-3 Guide, and the TG-10 Guide

Tape Path Adjustment (PLAY mode)(check)(6-1) → Tape Path Check (FF, REW mode)(6-2)

Replacement of the A/T Head

Audio Head Zenith Adjustment (6-11) → Tape Threading/Unthreading check (6-3) → Tracking Adjustment (check)(6-8) → Tape Path Adjustment (PLAY mode)(check) (6-1) → Tape Path Check (FF, REW mode)(6-2) → Audio Head Height Adjustment (6-13) → Audio Head Phase Adjustment (6-14) → Audio System Adjustment (8-4)

Replacement of the TG-8 Guide and the Slant Guide

Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check)(6-8) → Tape Path adjustment (PLAY mode)(check)(6-1) → Tape Path Check (FF, REW mode) (6-2) → Audio Head Height Adjustment (6-13) → Audio Head Phase Adjustment (6-14)

Replacement of the Pinch Arm Assembly and the Pinch Roller Sub assembly

Pinch Press Lever Position Adjustment (5-3) → Tape Threading/Unthreading Check (6-3) → Tape Path Check (Around the Pinch Roller)(6-5) → Tape Path Adjustment (PLAY mode)(6-1) → Tape Path Check (FF, REW mode)(6-2)

Replacement of the TG-11

Tape Threading/Unthreading Check (6-3) → Tape Path Check (Around the Pinch Roller)(6-5) → Tape Path Adjustment (PLAY mode)(6-1) → Tape Path Check (FF, REW mode)(6-2)

Replacement of the S Rail (I)

Threading Position Check (Supply side)(5-5) → Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check)(6-8) → Tape Path Adjustment (PLAY mode) (check)(6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (6-9) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12) → Audio Head Height Adjustment (6-13) → TC Head Position Adjustment (check)(6-12) → Audio Head Phase Adjustment (6-14) → PB Switching Position Adjustment (6-15)

Replacement of the T Rail (I)

Threading Position Check (Take-up side)(5-6) → Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check)(6-8) → Tape Path Adjustment (PLAY mode)(check)(6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (6-9) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12) → Audio Head Height Adjustment (6-13) → TC Head Position Adjustment (check)(6-12) → Audio Head Phase Adjustment (6-14) → PB Switching Position Adjustment (6-15)

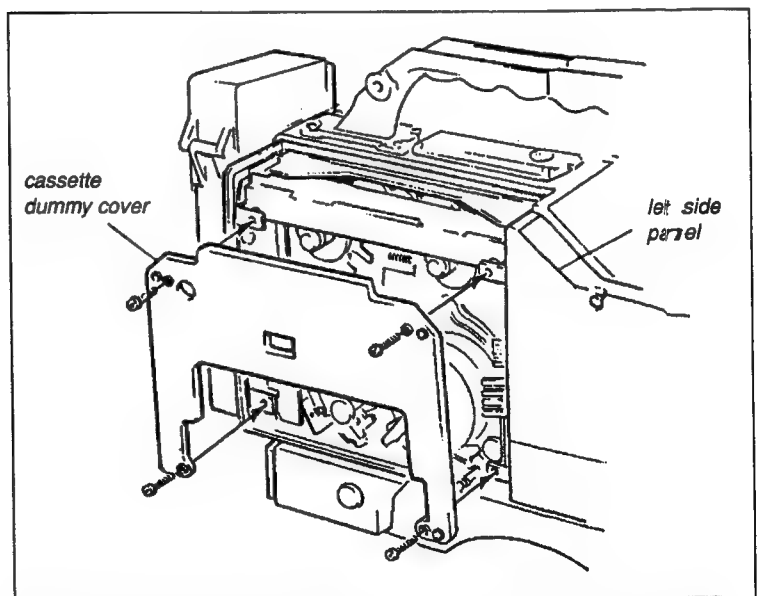
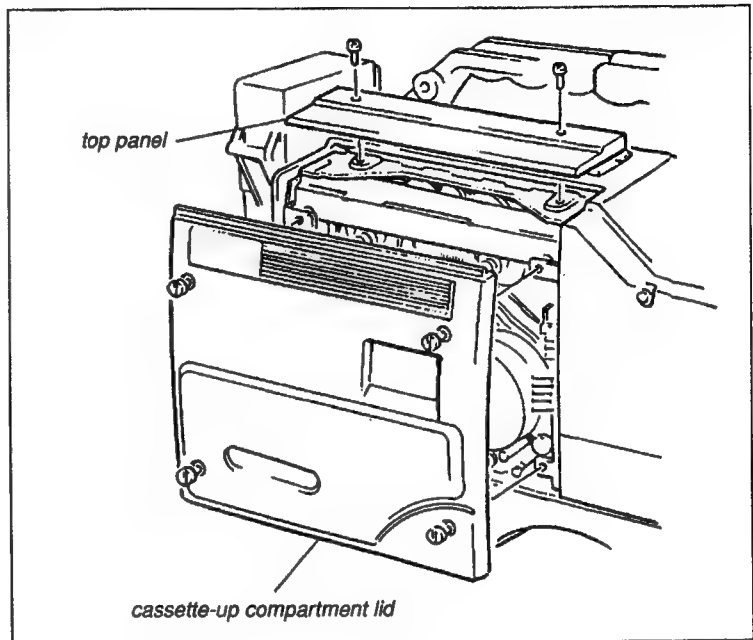
SECTION 5 LINK SYSTEM ALIGNMENT

(Preparations)

1. VTR's Mechanical Deck Block Adjustment

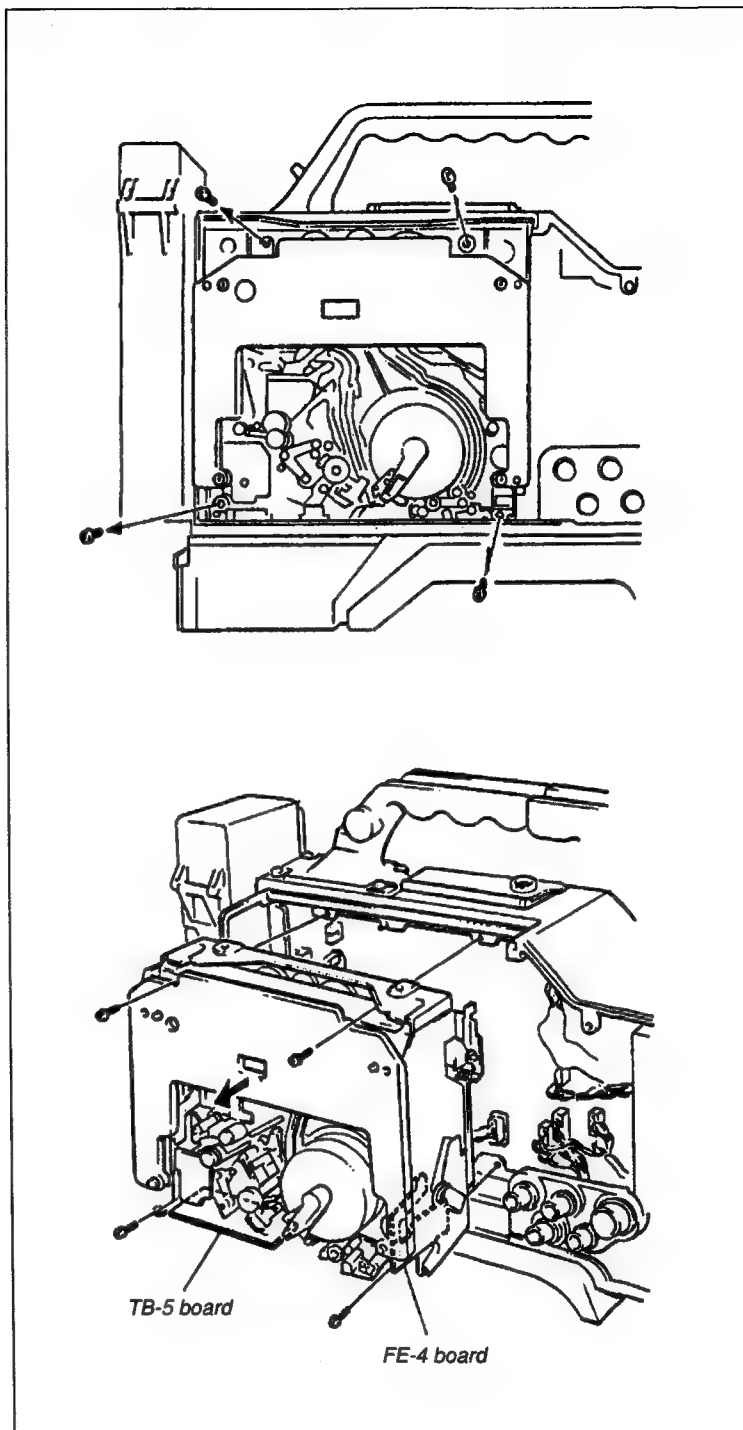
Adjust the VTR's mechanical deck block as follows.

- (1) Put the VTR into the threading end mode.
- (2) Remove the Top Panel.
- (3) Remove the Cassette-up Compartment Lid and install the Cassette Dummy Cover which is prepared for service.
- (4) Remove the Left Side Panel.



- (5) Remove the four screws which secure the mechanical deck block to the unit by using the hexagon bit.
- (6) Remove the mechanical deck block from the unit while removing the connectors below on the mother board.

Drum:	CN41 and CN42
FE-4 board:	CN43
TB-5 board:	CN44
- (7) Connect the Extension Harness which is prepared for service to the above connectors on the mechanical deck block.
- (8) Connect the harness connector of the Extension Harness to the above connectors on the unit's mother board.

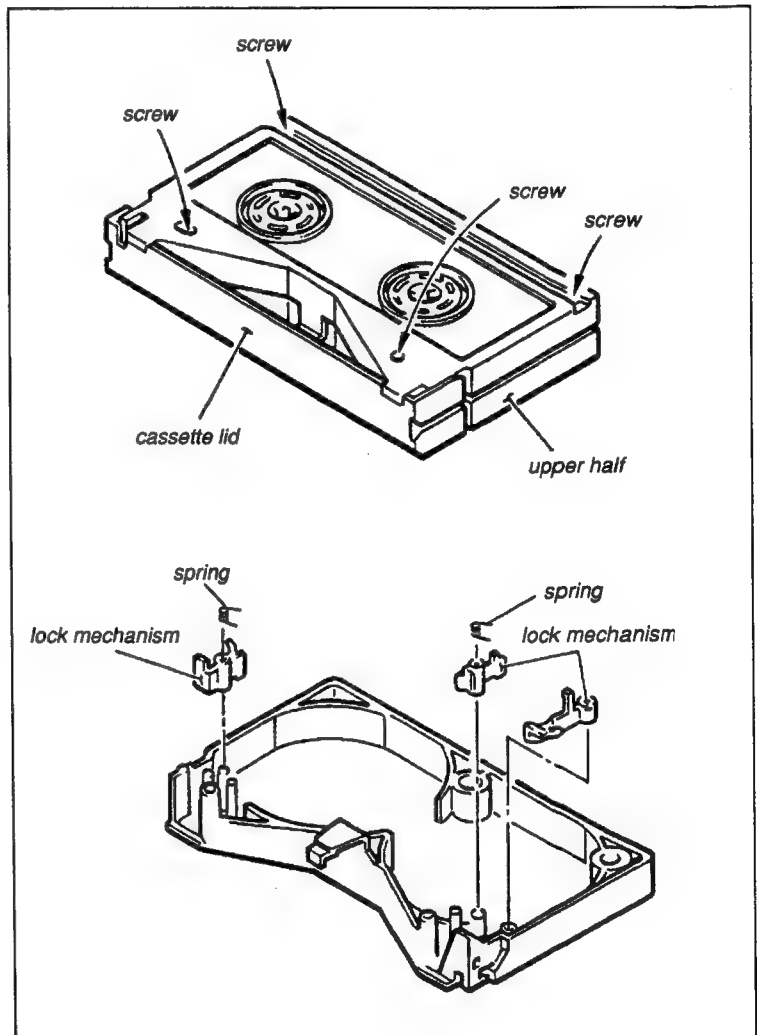


2. Creating the Blank Cassette/Cassette Tape without Lid/Alignment Tape without Lid

Since the VTR is designed to compact size, some mechanical checks and adjustments cannot be performed when a cassette tape lid or cassette tape is installed. Remove the cassette tape lid or cassette tape as follows:

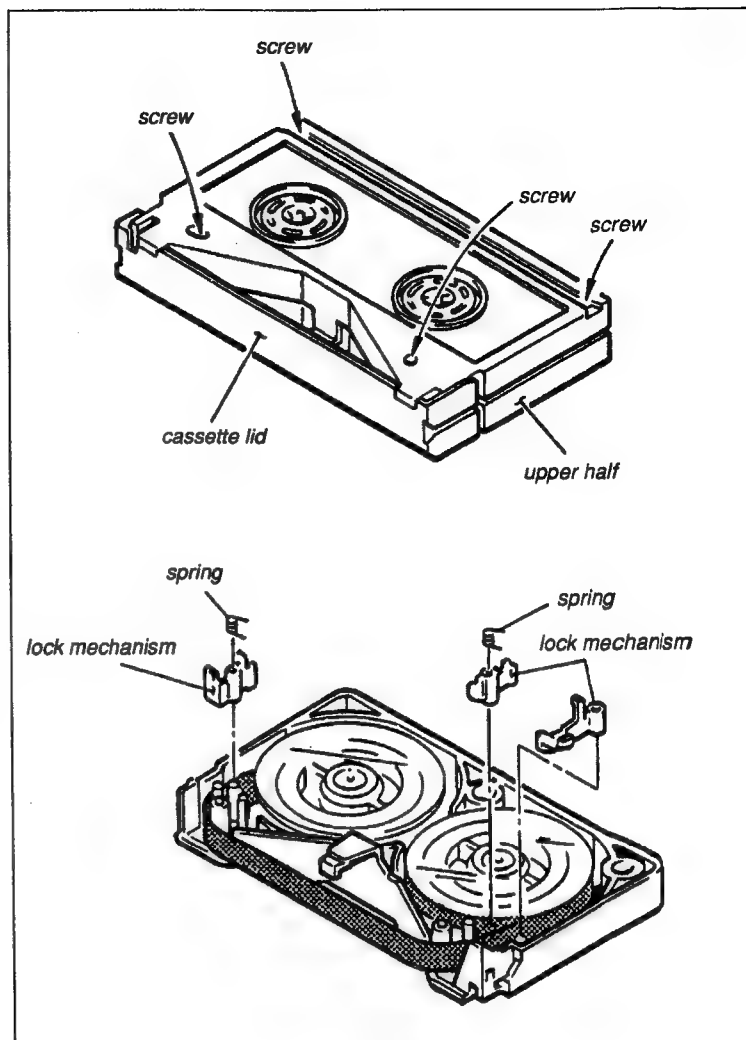
• Creating the blank cassette

- (1) Remove the four fixing screws on the back of a cassette tape and remove the upper half of the cassette tape as shown in the figure.
- (2) Remove the lock mechanism parts and the springs on the left and right.
- (3) Remove the cassette lid from the upper half.
- (4) Remove the cassette tape.
- (5) Install the upper half on the lower half with the four fixing screws from the back side.



• Creating the Cassette Tape without Lid

- (1) Remove the four fixing screws on the back of a cassette tape and remove the upper half of the cassette tape as shown in the figure.
- (2) Remove the lock mechanism parts and the springs on the left and right.
- (3) Remove the cassette lid from the upper half.
- (4) Install the upper half on the lower half with the four fixing screws from the back side.

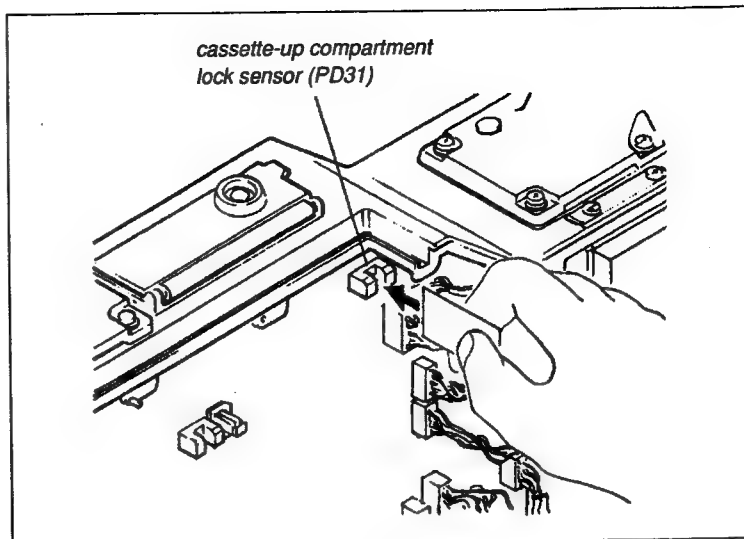


• Creating the Alignment Tape without Lid

- (1) Remove the four fixing screws on the back of a cassette tape and remove the upper half of the alignment tape as shown in the figure.
- (2) Remove the lock mechanism lock parts and the springs on the left and right.
- (3) Remove the cassette lid from the upper half.
- (4) Install the upper half on the lower half with the four fixing screws from the back side.

3. How to Operate the removed Mechanical Deck Block from the VTR

- (1) Push down the Cassette-up Compartment.
- (2) Insert a paper and so on into the Cassette-up Compartment Lock Sensor as Ref. No. PD31 on the MB-440/440P board, and put the unit into the Cassette Lock Mode. The unit will start to thread by this operation.



5-1. GEAR ASSEMBLY POSITION ADJUSTMENT

Tool: Tension scale (50 g full scale)

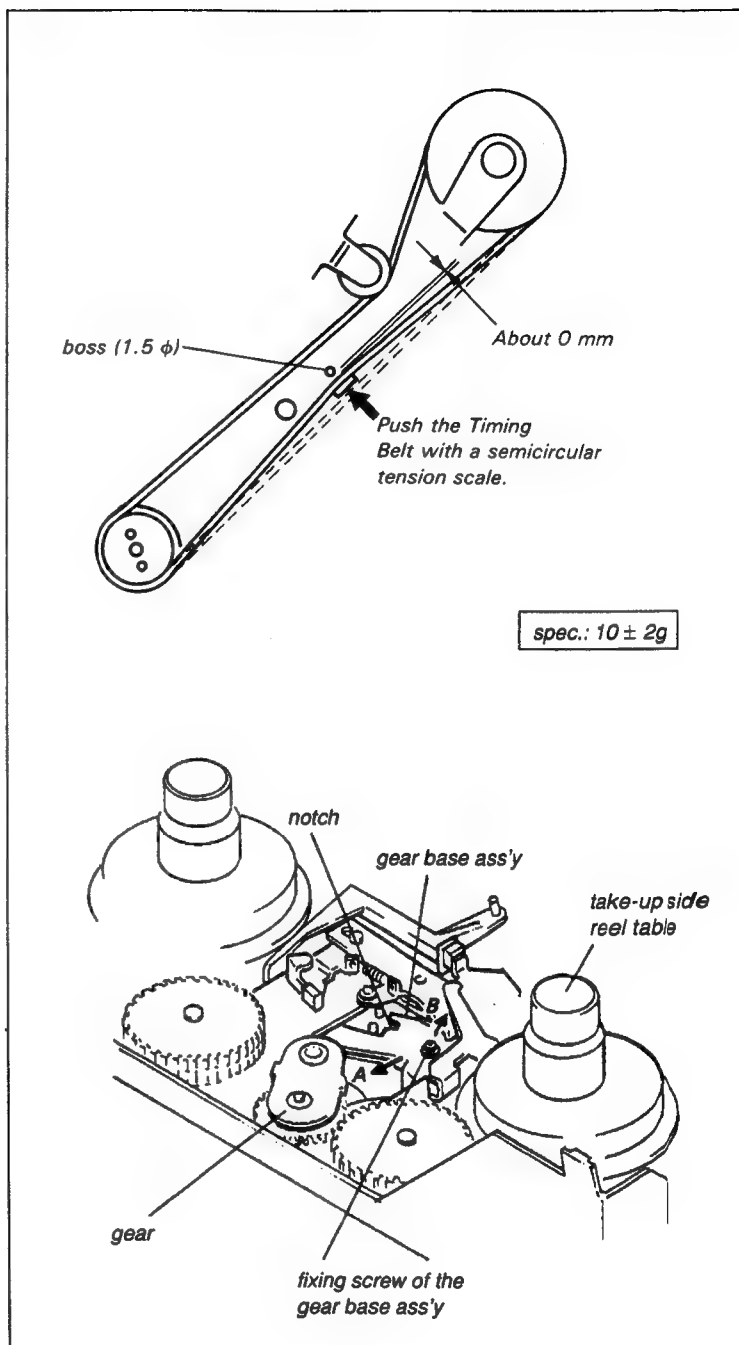
Mode: Any mode is acceptable. (Put the unit into the threading mode.)

Check procedure:

- (1) Push the Timing Belt in the direction of the arrow with a tension scale as shown in the figure.
- (2) Check that the reading of the tension scale meets the required specification, when the clearance between the boss and the Timing Belt is about 0 mm.

Adjustment procedure:

- (1) Loosen the fixing screw of Gear Base Ass'y by one or two turns.
- (2) Insert a flatblade screwdriver into the notch as shown in the figure, and move the Gear Base Ass'y in the direction as follows:
 - When the reading of the tension scale is smaller than the required specification : in the direction of A
 - When the reading of the tension scale is bigger than the required specification : in the direction of B
- (3) Tighten the fixing screw of the Gear Base Ass'y.
- (4) Perform steps (1) and (2). If the required specification is not satisfied, repeat the adjustment procedures (1) to (4).



5-2. PRESS LEVER POSITION CHECK

Tool: Blank cassette tape

Wire clearance gauge (0.1mm)

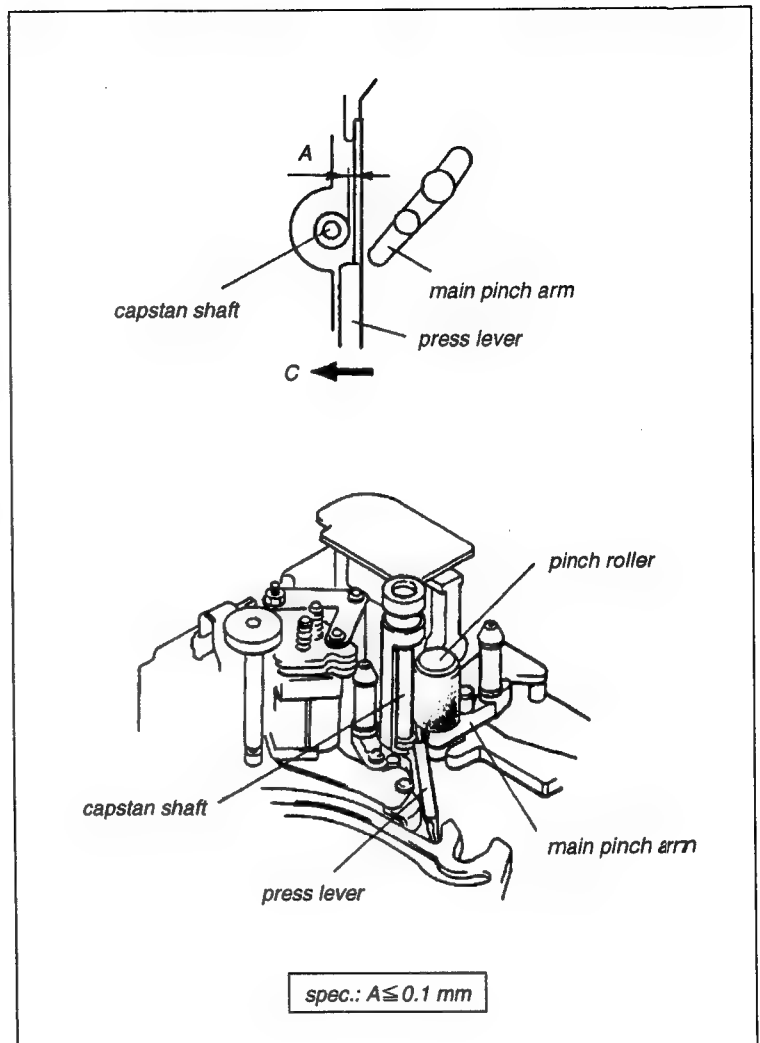
Setting: Remove the Cassette-up Compartment from the mechanical deck.

Mode: Play back the blank cassette tape and turn off the POWER switch.

Check procedure:

- (1) Insert the blank cassette tape, put the unit into the PLAY mode, then turn off the POWER switch.
- (2) When Pushing the Press Lever in the direction of the arrow C, check that clearance A between the capstan shaft and the Press Lever meets the required specification.

- When clearances A do not meet the required specification, perform the Pinch Press Lever Position Adjustment in Section 5-3.



5-3. PINCH PRESS LEVER POSITION ADJUSTMENT

Tool: Blank cassette tape

Wire clearance gauge (0.1, 0.2mm)

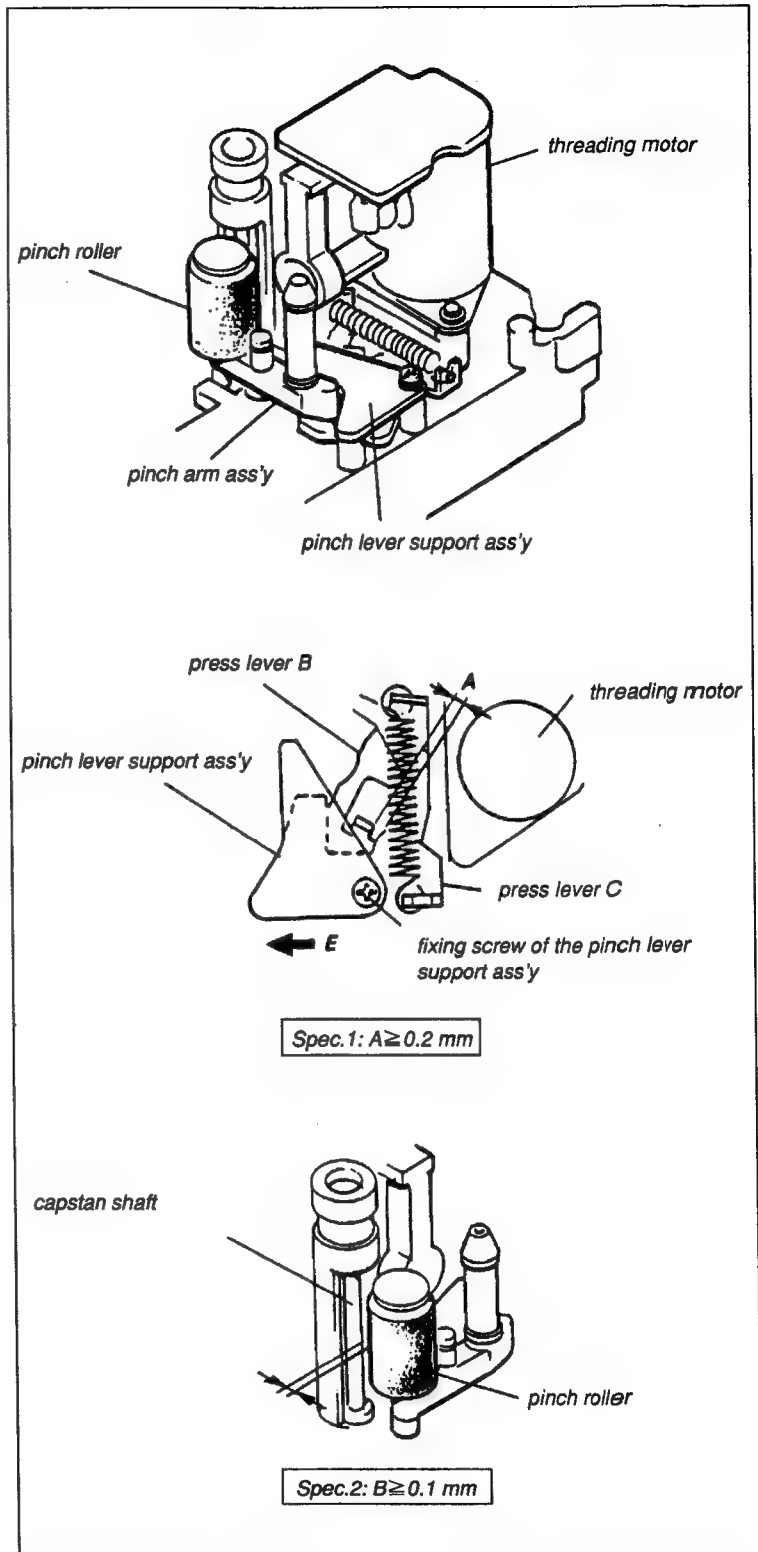
Mode: Play back and stop modes with the blank cassette tape.

Check procedure:

- (1) Insert the blank cassette tape and put the unit into the PLAY mode.
- (2) Confirm that clearance A between Press Levers (B) and (C) meets the required specification. (Spec. 1)
- (3) Put the unit into the STOP mode.
- (4) Confirm that clearance B between the pinch roller and the capstan shaft meets the required specification. (Spec. 2)

Adjustment procedure:

- Adjust so that clearances A and B meet the required specifications.
- (1) Insert the blank cassette tape and put the unit into the PLAY mode.
 - (2) Loosen the fixing screw of the Pinch Lever Support Ass'y by one turn.
 - (3) Adjust the assembly position so that clearance A between Press Levers (B) and (C) meets the required specification, when pushing the Pinch Lever Support Ass'y in the direction of arrow E.
 - (4) Tighten the fixing screw of the Pinch Lever Support Ass'y.
 - (5) Put the unit into the STOP mode and confirm that clearance B between the pinch roller and the capstan shaft meets the required specification.
- When the specification is not satisfied, repeat Steps (1) through (5).



5-4. REEL FG OUTPUT LEVER CHECK

Tool: Blank cassette tape
Extension Board
Oscilloscope

Setting: (1) Extend the SY-117C/117CP Board with the Extension Board.
(2) Connect the oscilloscope to the measuring point below.
Take-up reel FG:
TP3 / Extension Board
Supply reel FG:
TP4 / Extension Board

Mode: FF/REW mode

Check procedure:

- (1) Insert the blank cassette tape and put the unit into the FF mode.
- (2) Confirm that the output waveform of the take-up reel FG meets the required specification.
- (3) Put the unit into the REW mode.
- (4) Confirm that the output waveform of the supply reel FG meets the required specification.

- When the FG output waveform does not meet the required specification, replace the reel table or the sensor.



Spec.: $A \geq 4.5 \text{ V}$

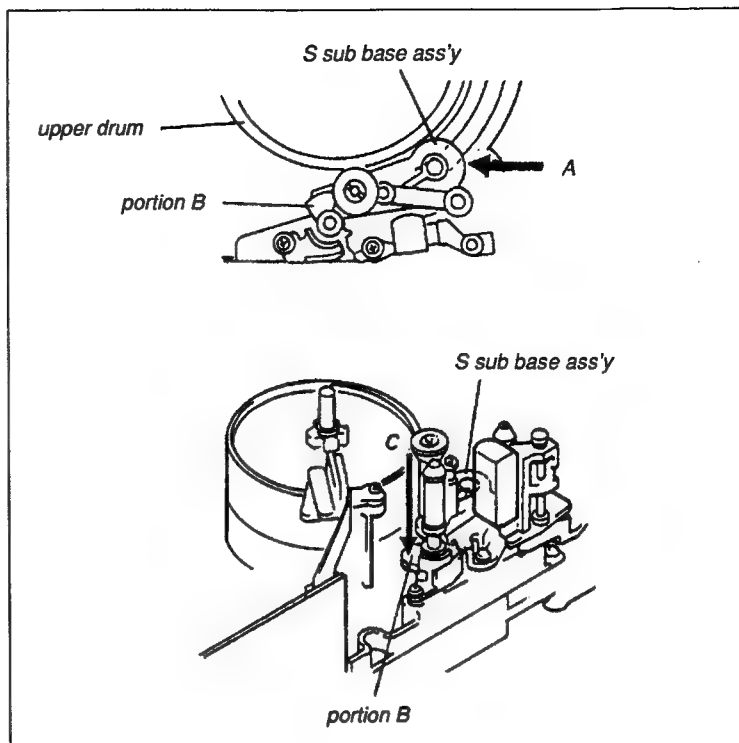
5-5. THREADING POSITION CHECK (SUPPLY SIDE)

Tool: Blank cassette tape

Mode: Put the unit into the threading completion mode and turn off the POWER switch.

Check procedure:

- (1) Insert the blank cassette tape, put the unit into the threading completion mode, then turn off the POWER switch.
- (2) When Pushing the S Sub Base Ass'y in the direction of the arrow A with a flatblade precision driver (2mm), confirm that it will not move.
- (3) When portion B of the S Sub Base ASS'y is pushed in the direction of the arrow C with a flatblade precision driver (2mm), confirm that it will not move in the vertical direction.
- (4) Confirm that the specifications are satisfied by repeating Steps (1) through (3) two or three times.



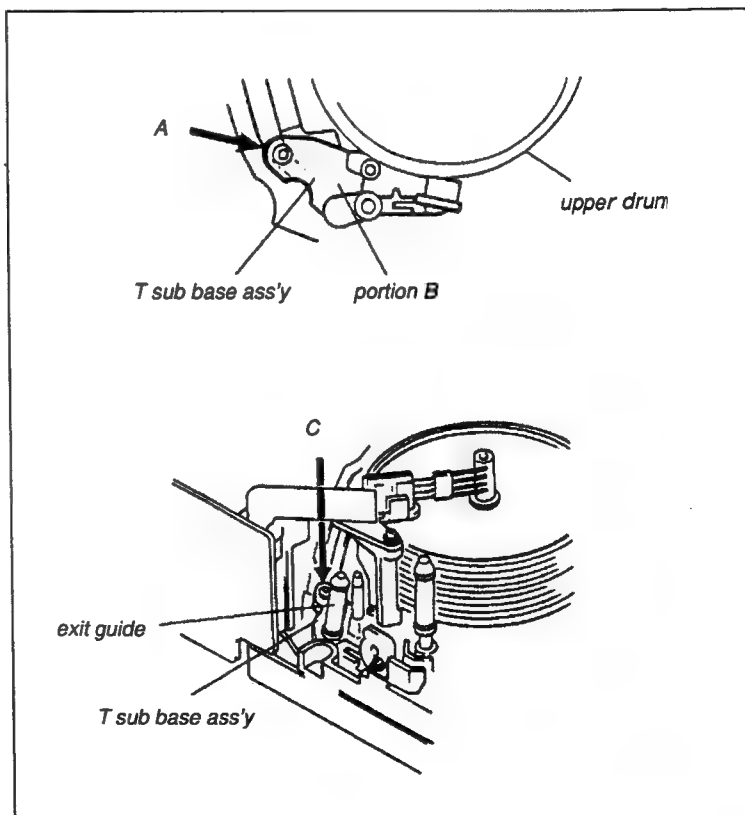
5-6. THREADING POSITION CHECK (TAKE-UP SIDE)

Tool: Blank cassette tape

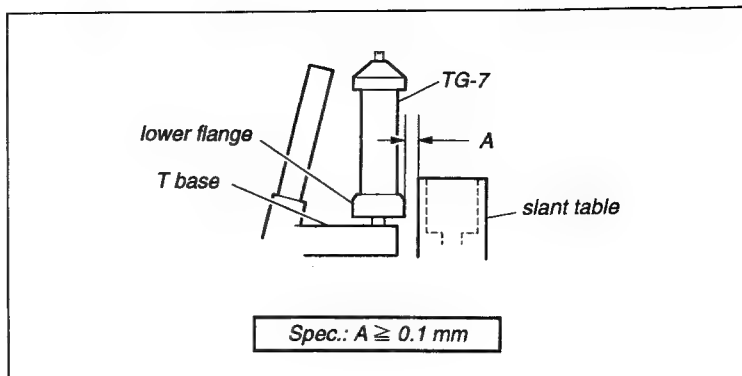
Mode: Put the unit into the threading completion mode and turn off the POWER switch.

Check procedure:

- (1) Insert the blank cassette tape, put the unit into the threading completion mode, and then turn off the POWER switch.
- (2) When pushing the T Sub Base Ass'y in the direction of the arrow A with a flatblade precision driver (2mm), confirm that it will not move.
- (3) When pushing portion B of the T Sub Base Ass'y in the direction of the arrow C with a flatblade precision driver (2mm), confirm that it will not move in the vertical direction.
- (4) Confirm that the required specifications are satisfied by repeating Steps (1) through (3) two or three times.



- (5) Check the clearance A between the lower flange of the TG-7 and the slant table so that it meets the specification.



5-7. IMPEDANCE ROLLER GUIDE II CLEARANCE ADJUSTMENT

Tool: Blank cassette tape

Wire clearance gauge (0.2, 0.4mm)

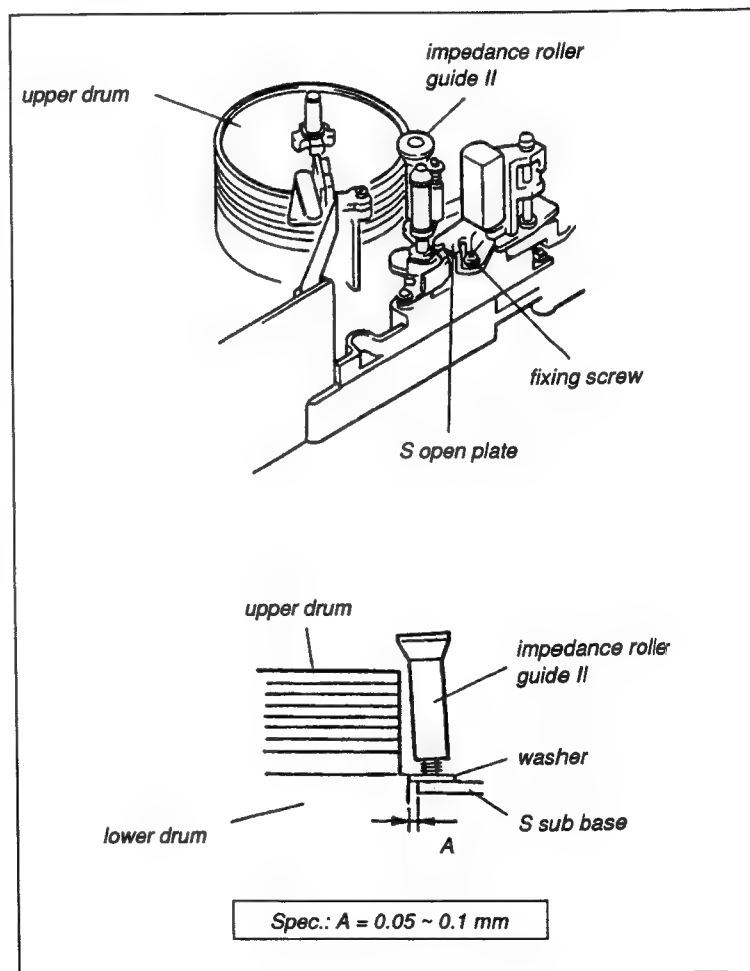
Mode: Put the unit into the threading completion mode and turn off the POWER switch.

Check procedure:

- (1) Insert the blank cassette tape, put the unit into the threading completion mode, then turn off the POWER switch.
- (2) Confirm that clearance A between the lower Drum Ass'y and S sub Base ass'y meets the required specification.

Adjustment procedure:

- (1) Loosen the fixing screw of the S Open Plate by one turn and adjust the S Open Plate position so that clearance A meets the required specification.
- (2) Perform Steps (1) and (2) in the check procedure and confirm that the required specification is satisfied.



5-8. TENSION REGULATOR OPERATING POSITION ADJUSTMENT

Tool: Cassette tape without a lid (BCT-30G)
(at the tape beginning)

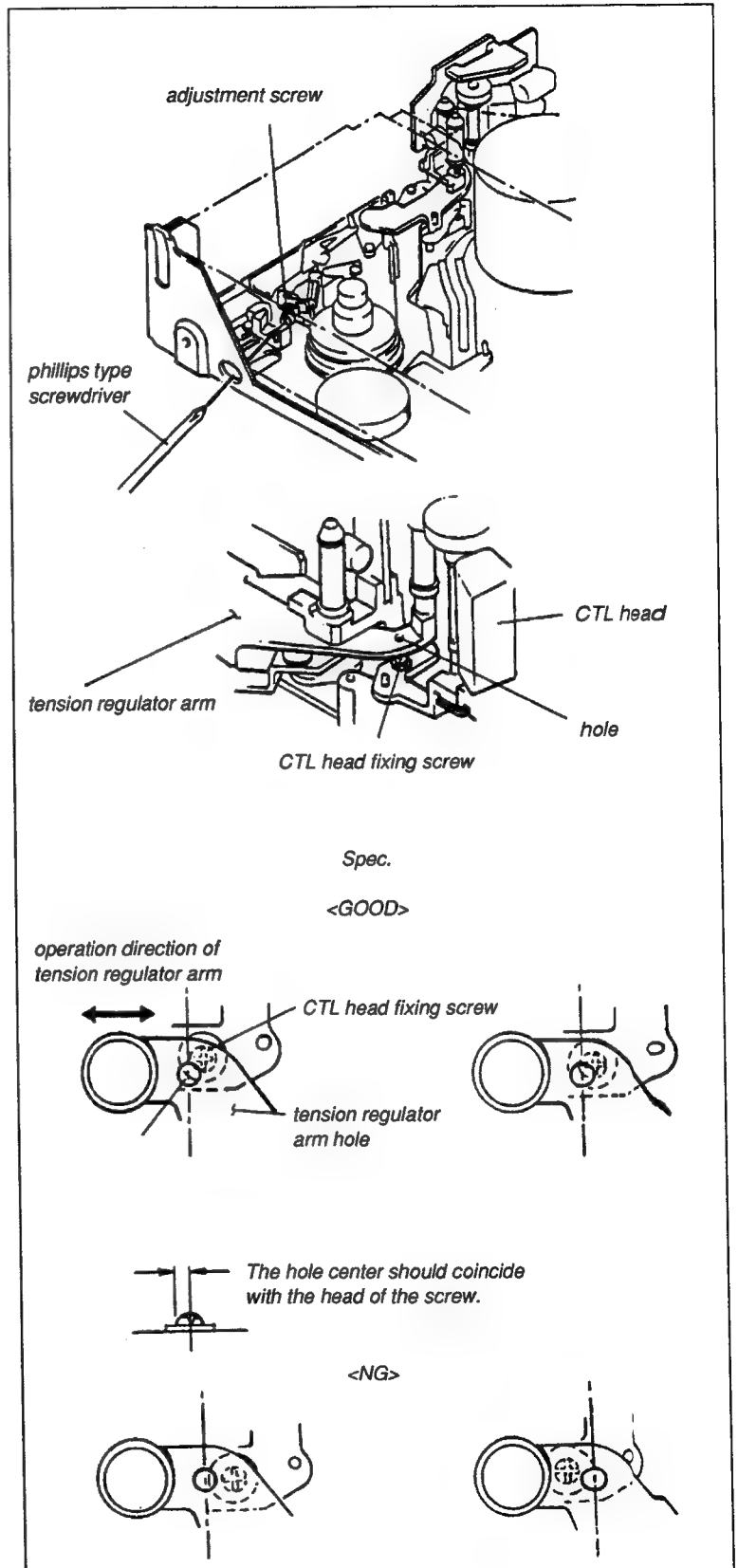
Mode: Play back the cassette tape without a lid.

Check procedure:

- (1) Confirm that the positional relationship between the Tension Regulator Arm's hole and the CTL Head Fixing Screw meets the required specification.

Adjustment procedure:

- (1) Insert a phillips type screwdriver through the hole shown in the figure.
- (2) Turn the adjustment screw so that the required specification is satisfied.



SECTION 6

TAPE RUN ALIGNMENT

(Preparations)

1. VTR's Mechanical Deck Block Adjustment

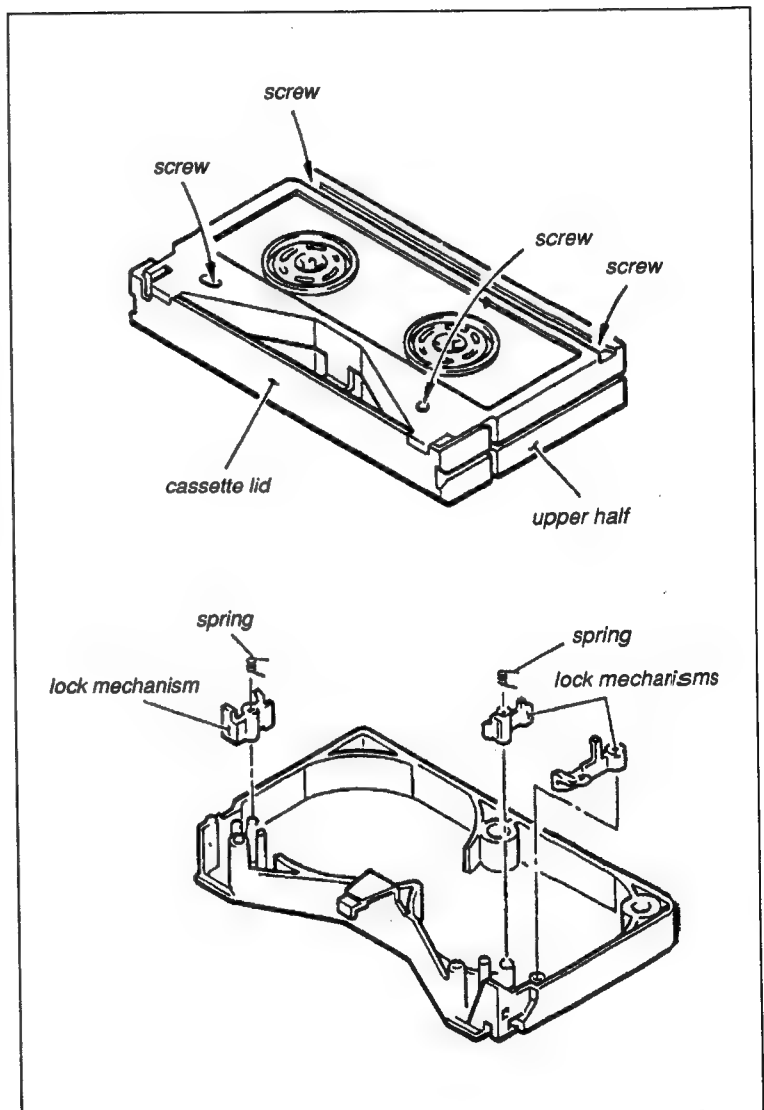
When the mechanical deck assy is removed from the unit for performing the tape run alignment, please refer to SECTION 5 LINK SYSTEM ALIGNMENT. 6-5. TAPE PATH ADJUSTMENT, 6-8. TRACKING ADJUSTMENT must be performed after mechanical deck assy is reinstalled in the unit.

2. Creating the Blank Cassette/Cassette Tape without Lid/Alignment Tape without Lid

Since the VTR is designed to compact size, some mechanical checks and adjustments cannot be performed when a cassette tape lid or cassette tape is installed. Remove the cassette tape lid or cassette tape as follows:

- Creating the blank cassette

- (1) Remove the four fixing screws on the back of a cassette tape and remove the upper half of the cassette tape as shown in the figure.
- (2) Remove the lock mechanism parts and the springs on the left and right.
- (3) Remove the cassette lid from the upper half.
- (4) Remove the cassette tape.
- (5) Install the upper half on the lower half with the four fixing screws from the back side.

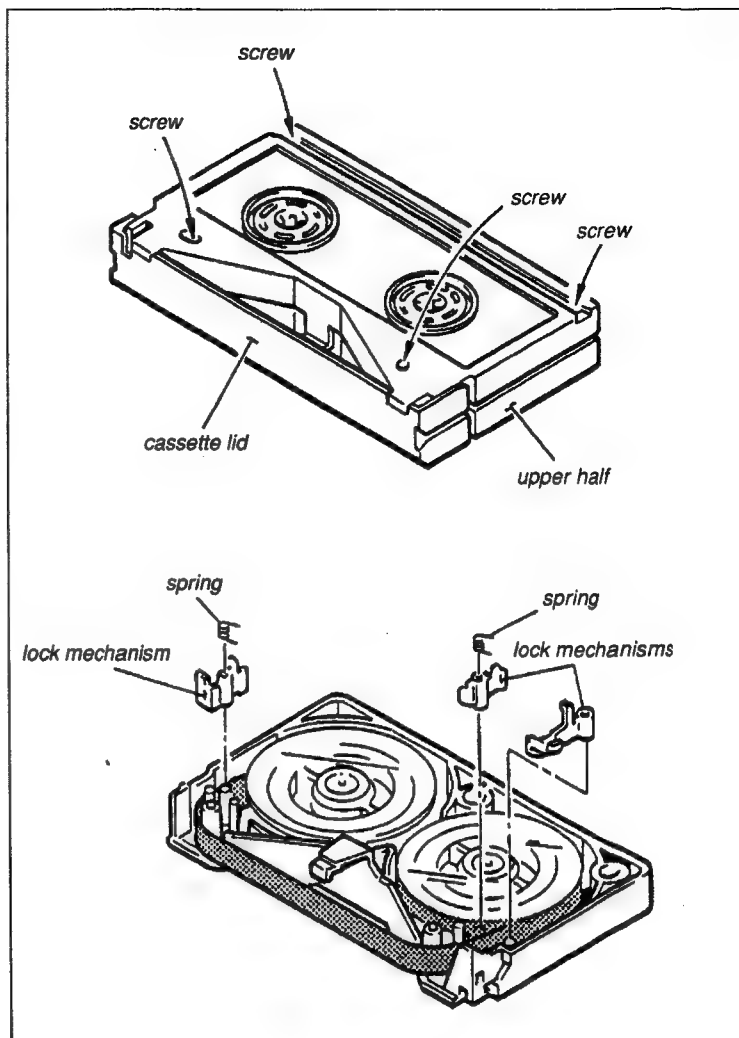


• **Creating the Cassette Tape without Lid**

- (1) Remove the four fixing screws on the back of a cassette tape and remove the upper half of the cassette tape as shown in the figure.
- (2) Remove the lock mechanism parts and the springs on the left and right.
- (3) Remove the cassette lid from the upper half.
- (4) Install the upper half on the lower half with the four fixing screws from the back side.

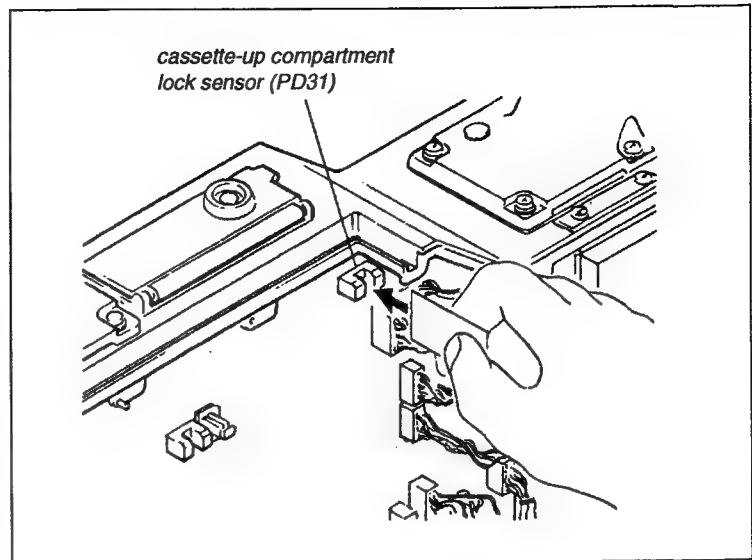
• **Creating the Alignment Tape without Lid**

- (1) Remove the four fixing screws on the back of a cassette tape and remove the upper half of the alignment tape as shown in the figure.
- (2) Remove the lock mechanism lock parts and the springs on the left and right.
- (3) Remove the cassette lid from the upper half.
- (4) Install the upper half on the lower half with the four fixing screws from the back side.



3. How to Operate the removed Mechanical Deck Block from the VTR

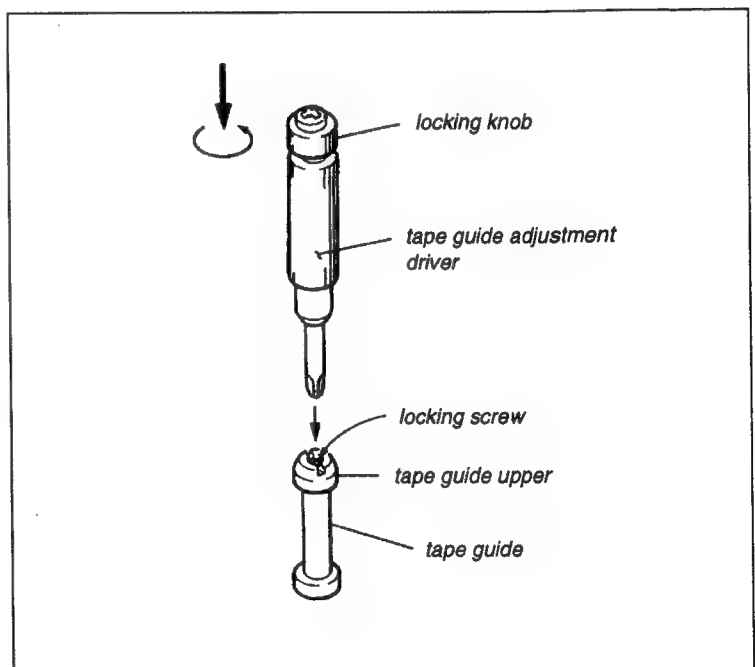
- (1) Push down the Cassette-up Compartment.
- (2) Insert a paper and so on into the Cassette-up Compartment Lock Sensor as Ref. No. PD31 on the MB-440/440P board, and put the unit into the Cassette Lock Mode. The unit will start to thread by this operation.



4. Height Adjustment Procedure of the Tape Guide

When the height adjustment of the tape guide is performed in the Tape Run Alignment, use the tape guide adjustment driver (J-6321-500-A) prepared for the maintenance tool. After the height adjustment of the tape guide is completed, tighten the locking screw of the tape guide upper flange with the torque driver referring to Sec. 3-15.

- (1) Put the flatblade of the tape guide adjustment driver in the (-)slot of the tape guide.
- (2) Push down the locking knob of the adjustment driver and turn it counterclockwise about one turn.
- (3) Turn the adjustment driver and adjust the height of the tape guide.
- (4) After the adjustment is completed, tighten the locking screw of the tape guide upper flange referring to Sec. 3-15.
- (5) Apply the locking compound to the locking screw. (Never apply the locking compound to the tape running surface of the tape guide, upper and lower flanges.)



6-1. TAPE PATH ADJUSTMENT (PLAY MODE)

Tool: Cassette tape without a lid (BCT-30G)
Tape guide adjustment driver

Mode: Play back the cassette tape without a lid.

Check procedure:

- (1) Insert the cassette tape without a lid (BCT-30G) and put the unit into the PLAY mode.
- (2) Confirm that the tape runs without curl at the flanges of the TG-1, Tension Regulator Guide, TG-4, and Entrance Guide.
- (3) Confirm that the tape runs without curl at the flanges of the Exit Guide, TG-8, TG-10, and TG-11.

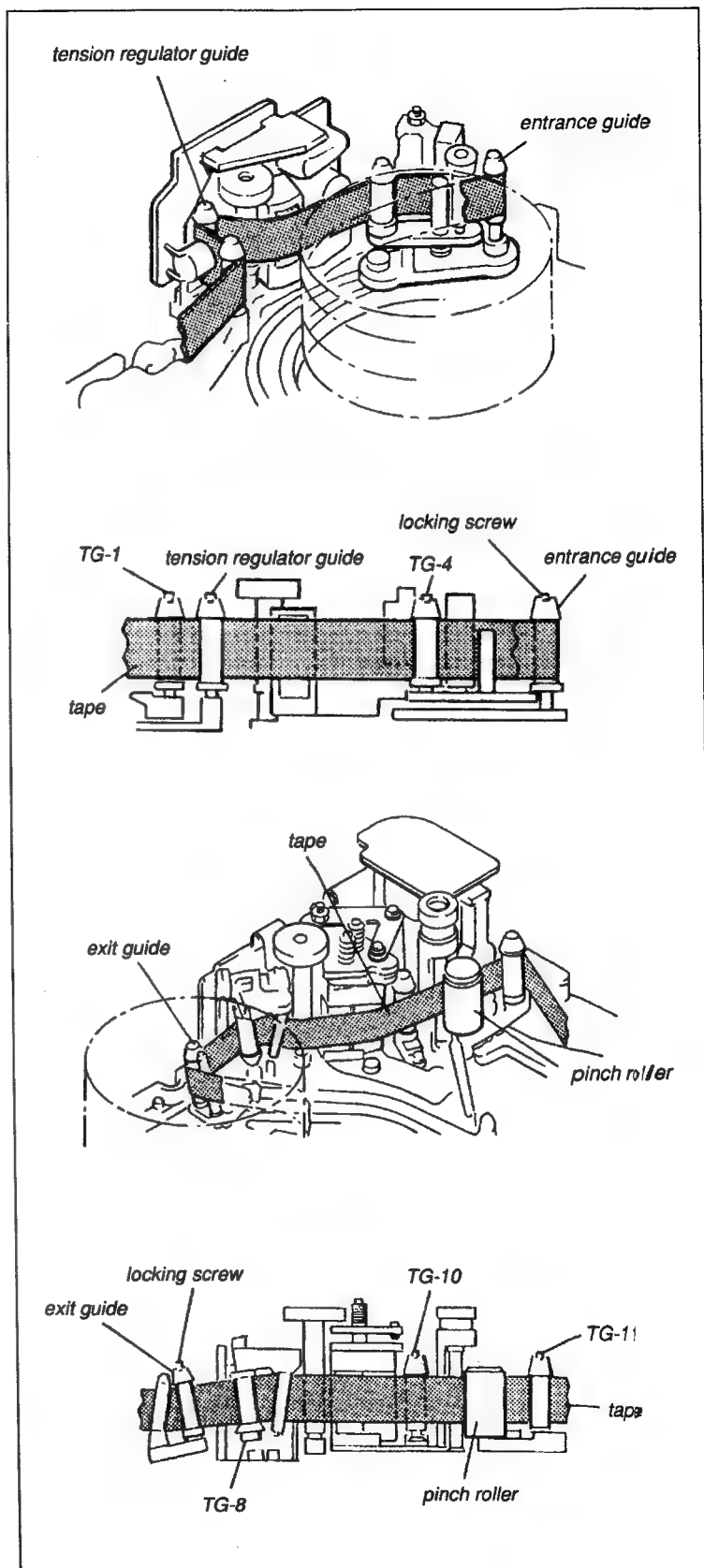
Adjustment procedure:

• Tape curl at the Entrance Guide or at the lead at the drum entrance side.

- (1) Loosen the Upper Flange Locking Screw of the Entrance Guide with tape guide adjustment driver by one or two turns.
- (2) Turn and adjust the flange of the Entrance Guide so that no tape curl occurs at the Upper Flange of the Entrance Guide and the tape runs along the lead at the drum entrance side.
- (3) Temporarily tighten the Upper Flange Locking Screw of the Entrance Guide.
- (4) Check that the tape runs without curl at the flanges of the TG-1 Tension Regulator Guide, TG-4, and Entrance Guide.

• Tape curl at the Exit Guide or at the lead at the drum exit side.

- (5) Loosen the Upper Flange Locking Screw of the Exit Guide with a tape guide adjustment driver by one or two turns.
- (6) Turn with a tape guide adjustment driver and adjust the flange of the Exit Guide so that no tape curl occurs at the Upper Flange of the Exit Guide and the tape runs along the lead at the drum exit side.
- (7) Temporarily tighten the Upper Flange Locking Screw of the Exit Guide.
- (8) Insert the cassette tape without a lid (BCT-30G), put the unit into the PLAY mode, and confirm that the tape runs without curl at the flanges of each guide.



6-2. TAPE PATH CHECK (FF AND REW MODES)

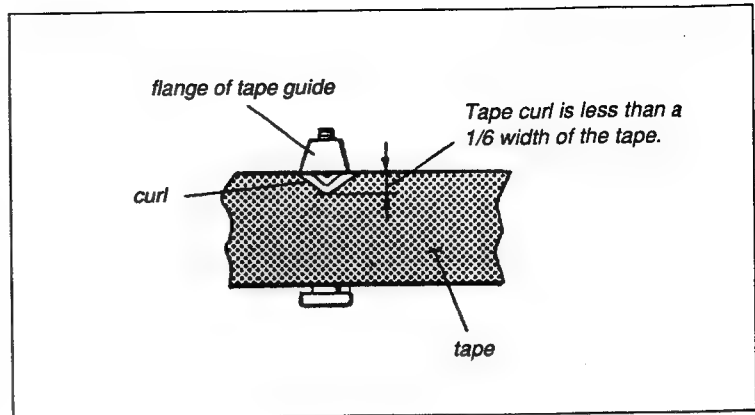
Tool: Cassette tape without a lid (BCT-30G)
(at the complete tape end)

Mode: Fast-forward and rewind mode with the
cassette tape without a lid.

Check procedure:

- (1) Insert the cassette tape without a lid (BCT-30G), put the unit into the FF mode, and confirm that the tape runs without curl at the flanges of each guide. If occurs, curl less than one sixth of the tape width can be acceptable.
- (2) Put the unit into the REW mode and confirm that the tape runs without curl at the flanges of each guide. If occurs, curl less than one sixth of the tape width can be acceptable.

- When the tape curl does not satisfy the required specification, perform the Tape Path Adjustment (PLAY mode) in Section 6-1 again.



6-3. TAPE THREADING/UNTHREADING CHECK

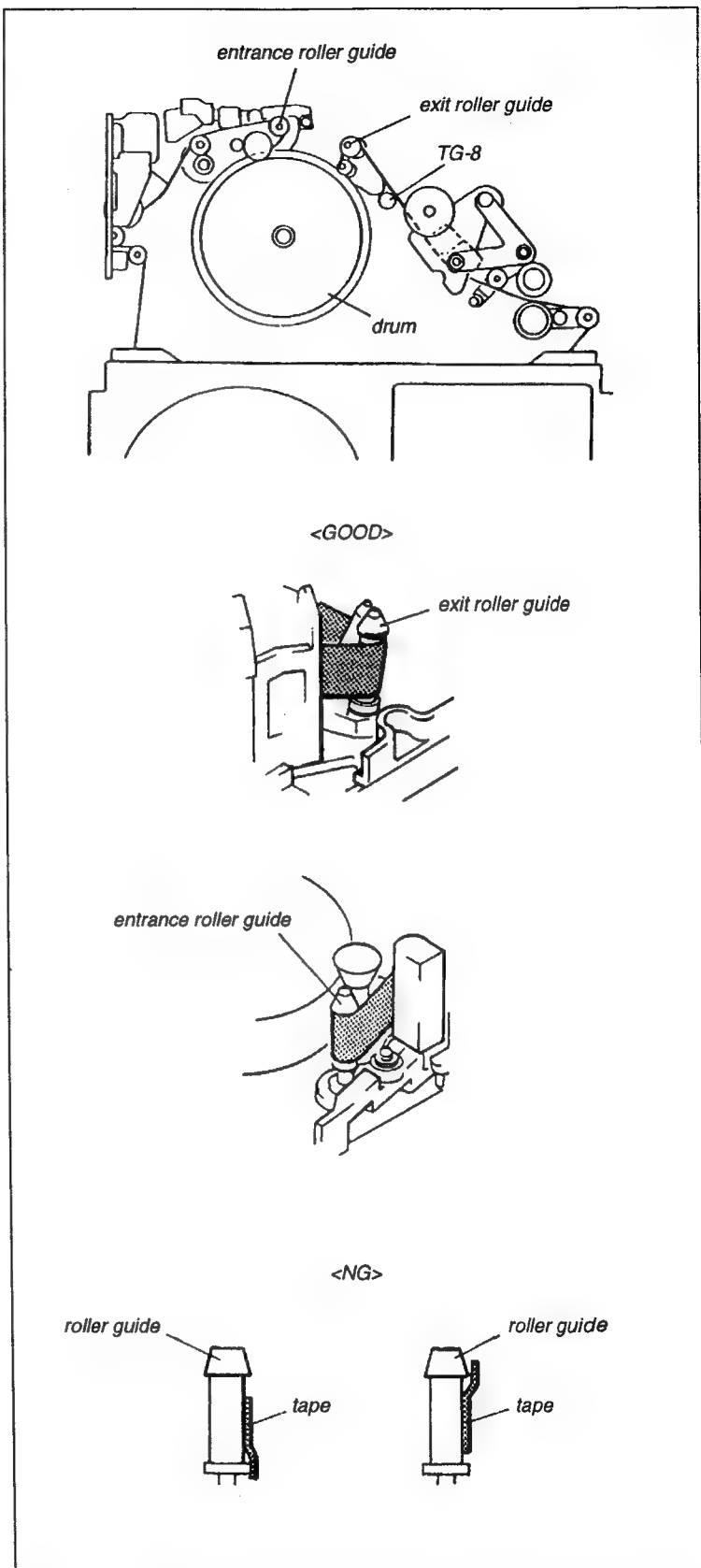
Tool: Cassette tape without a lid (BCT-30G) (at the complete tape beginning)

Cassette tape without a lid (BCT-30G) (at the complete tape end)

Mode: Thread the cassette tape without a lid.

Check procedure:

- (1) Thread the cassette tape without a lid at the complete tape beginning. Confirm that the tape is threaded at the upper and lower flanges of the Entrance and Exit Guide Rollers without curl at this time.
- (2) Put up the mechanical deck block with the cassette tape in the upper position and drum in the lower position.
- (3) Check that the threading and unthreading operation is smooth.
- (4) Repeat Steps (1) through (3) two or three times and confirm that the required specification is satisfied.
- (5) Thread the cassette tape without a lid at the complete tape end.
- (6) Check as in Step (1).
- (7) Check as in Steps (1) through (4).



6-4. PLAY BACK TENSION ADJUSTMENT

Tool: Cassette tape without a lid (BCT-30G)
(at the tape beginning)
Tentelometer: T2-H7-UMC

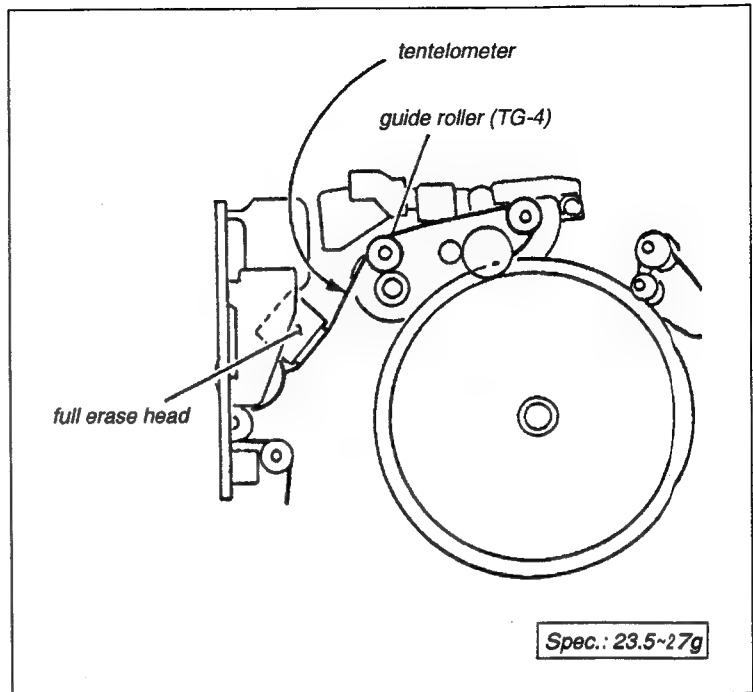
Mode: Play back the cassette tape without a lid

Check procedure:

- (1) Confirm that the tension regulator operating position meets the required specification in Sec. 5-8. Tension Regulator Operating Position Adjustment.
- (2) Insert the Tentelometer between Full Erase Head and Guide Roller (TG-4) as shown in the figure.
- (3) Confirm that the reading meets the required specification.

Adjustment procedure:

- (1) Adjust the tension regulator operating position so that the specification is satisfied within the limits required in Sec. 5-8.
- (2) When the required specification is not satisfied, replace the Supply Side Reel Table and Tension Regulator Band.
- (3) Perform the Sec. 5-8. Tension Regulator Operating Position Adjustment.
- (4) Perform the check procedure.



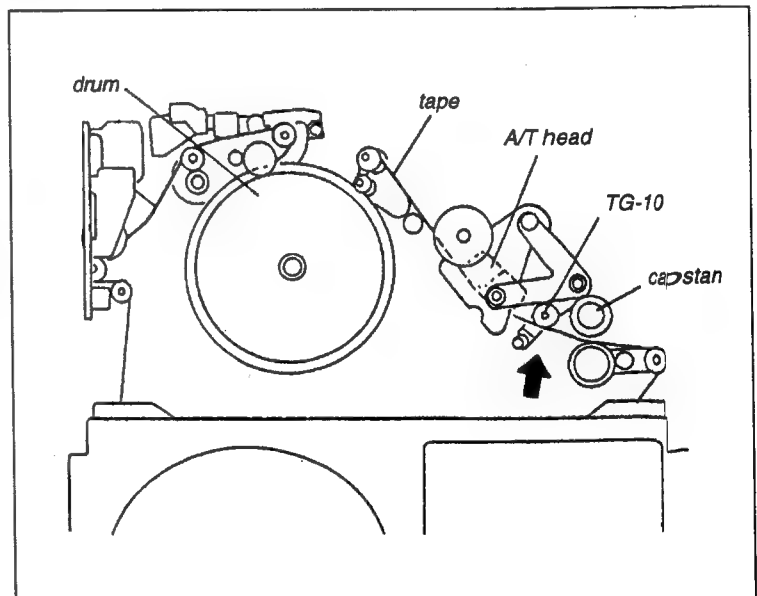
6-5. TAPE PATH ADJUSTMENT (AROUND THE PINCH ROLLER)

Tool: Cassette tape without a lid (BCT-30G)

Mode: Play back the cassette tape without a lid.

Check procedure:

- (1) Insert the cassette tape without a lid (BCT-30G) and put the unit into the PLAY mode.
- (2) Put the unit into the PLAY and STOP modes two or three times every two or three seconds and confirm that the tape path of the designated portion (between the A/T Head and capstan shaft) indicated by the arrow satisfies the specifications below.
 - No uneven tape tension occurs at the upper and lower edges of the tape.
 - When the pinch roller is pressed against the capstan shaft, any tape wrinkle occurring on the tape disappears within one second.
 - The tape is not damaged.
- (3) After unthreading is completed, put the unit into the threading and PLAY modes two or three times.
- (4) Put the unit into the PLAY mode and confirm that the tape path of the portion indicated by the arrow meets the required specifications in Step (2).



6-6. PLAY TORQUE CHECK

Tool: FWD torque cassette tape, SL-0003C

Mode: PLAY mode with torque cassette

Check procedure:

- (1) Put the unit into PLAY mode with a torque cassette.
- (2) After 2 or 3 seconds later, when the pinch roller is pressed against the capstan shaft, confirm that the indication of the meter on the T side of FWD torque cassette tape meets the required specification.

- When the required specification is not satisfied, replace the T Idler Ass'y.

*Spec.: PLAY torque
36±8 g·cm*

6-7. REV TORQUE CHECK

Tool: FWD torque cassette tape, SL-0003C

Servo remote control tool

Preparation:

Connect the connector on the servo remote control tool to CN2 on the SV-97A/97AP Board.

Mode: Insert the torque cassette tape and put the unit into the PLAY STOP REV mode.

Check procedure:

- (1) Insert the torque cassette tape and switch over the mode in the following steps.
(Put the unit into the REV mode finally.)

PLAY → STOP → REV

(When putting the unit into the PLAY and STOP modes, push the PLAY and STOP buttons on the VTR, and when putting into the REV mode, push the REV button on the servo remote control tool.)

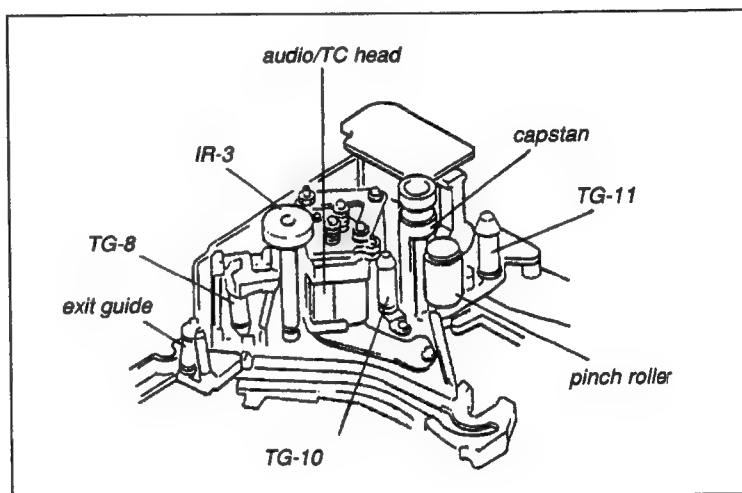
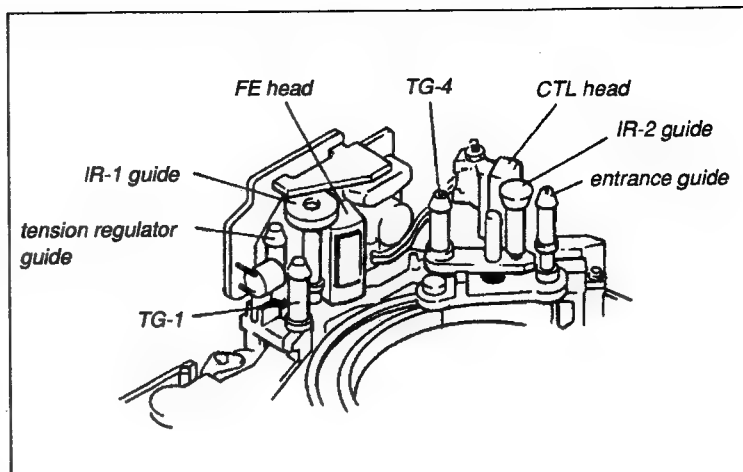
- (2) After 2 or 3 seconds later, confirm that the indication of the meter on the S side of FWD torque cassette tape meets the required specification.

- When the required specification is not satisfied, replace the S Idler Ass'y.

*Spec.: REV torque
55±15 g·cm*

6-8. TRACKING ADJUSTMENT

- The tape guides and heads at the drum entrance side in this adjustment are illustrated.
- The tape guides and heads at the drum exit side in this adjustment are illustrated.
- Before performing the tracking adjustment, clean the tape guide, stationary head, drum, capstan shaft, and pinch roller described above with a cloth moistened with cleaning fluid.
- The drum mounts four video heads for Y and C heads, respectively. The video tracking adjustment is made with channel 1 of the Y head as reference.
- After the tracking adjustment is completed, perform the adjustment as follows:
 - Sec 6-1 Tape Path Adjustment (Play Mode)
 - Sec 6-2 Tape Path Check (FF and REW Modes)
 - Sec 6-9 CTL Head Height Adjustment
 - Sec 6-10 CTL Head Position Adjustment
 - Sec 6-12 TC Head Position Adjustment
 - Sec 6-12 TC Head Position Adjustment (Check)
 - Sec 6-13 Audio Head Height Adjustment
 - Sec 6-14 Audio Head Phase Adjustment



Tool: Alignment tape without a lid (CR2-1B/1BPS)

Dental mirror

Oscilloscope

Tape guide adjustment driver

Servo remote control tool

Extension board EX-148

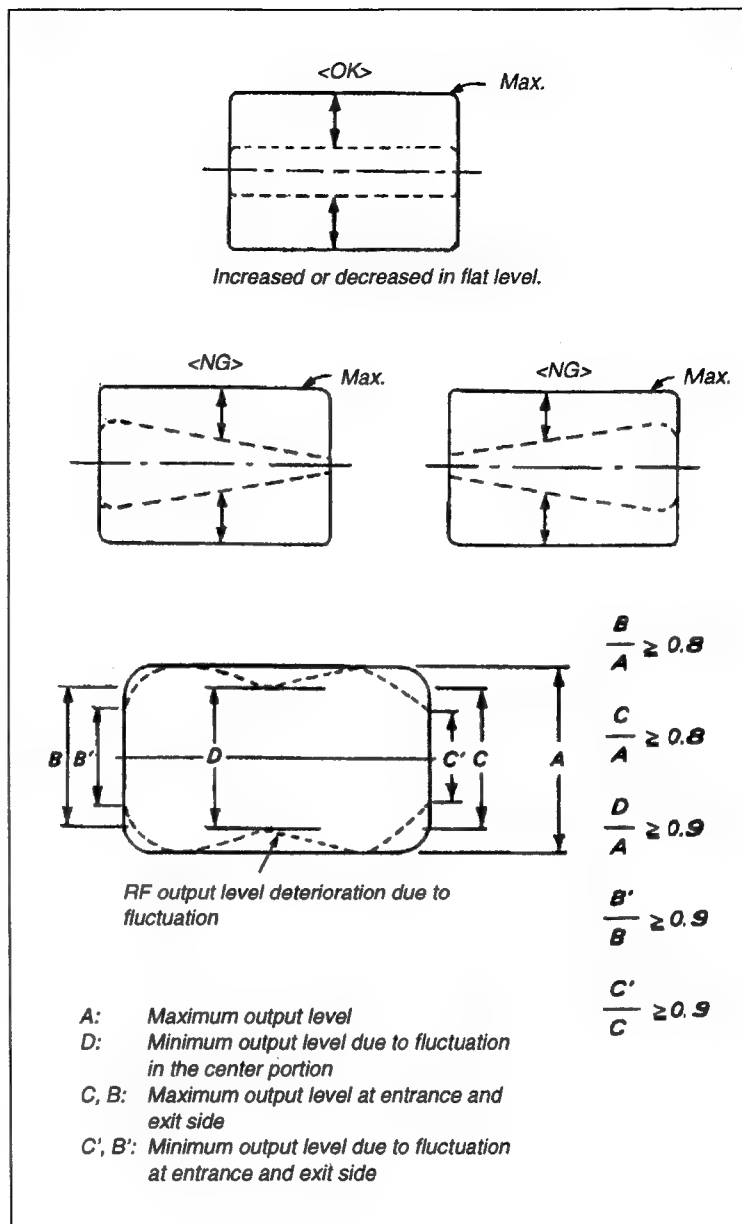
Setting: (1) Extend the VP-24/24P Board with the extension board.

(2) Connect the connector of the servo remote control tool to the CN2 on the SV-97A/97AP Board.

Mode: Play back the alignment tape.

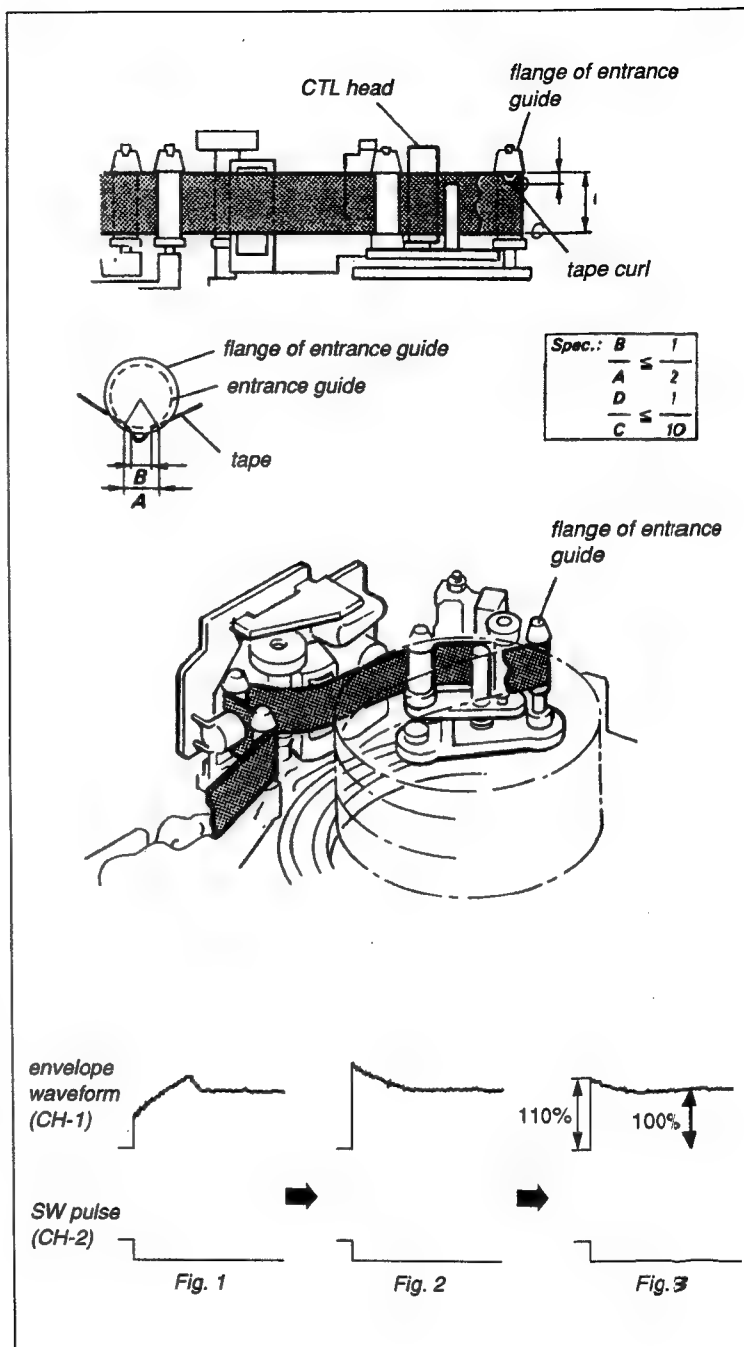
Check procedure:

- (1) Connect the oscilloscope as follows:
CH-1: TP33 / Extension Board
(waveforms of Y head in CH1 to CH4)
CH-2: TP25 / Extension Board
(Stair Pulse)
TRIG: TP25 / Extension Board
(Stair Pulse)
- (2) Insert the alignment tape CR2-1B/1BPS and put the unit into the PLAY mode.
- (3) Confirm that the waveforms of channels 1 through 4 of the Y head meet the required specifications of the Steps (4) and (5).
- (4) Confirm that the RF envelope waveform maintains flat while the amplitude increases and decreases, when pushed the (+) or (-) button of the tracking control on a servo remote control tool.
- (5) Check that the RF envelope waveform head-to-tape contact and fluctuation are within the specification at the maximum amplitude.
- (6) Connect the oscilloscope as follows:
CH-1: TP31 / Extension Board
(waveforms of CH1 through CH4 of C head)
CH-2: TP25 / Extension Board
(Stair pulse)
TRIG: TP25 / Extension Board
- (7) Confirm that the waveforms of channels 1 through 4 of the C head meet the required specifications of the Steps (4) and (5).

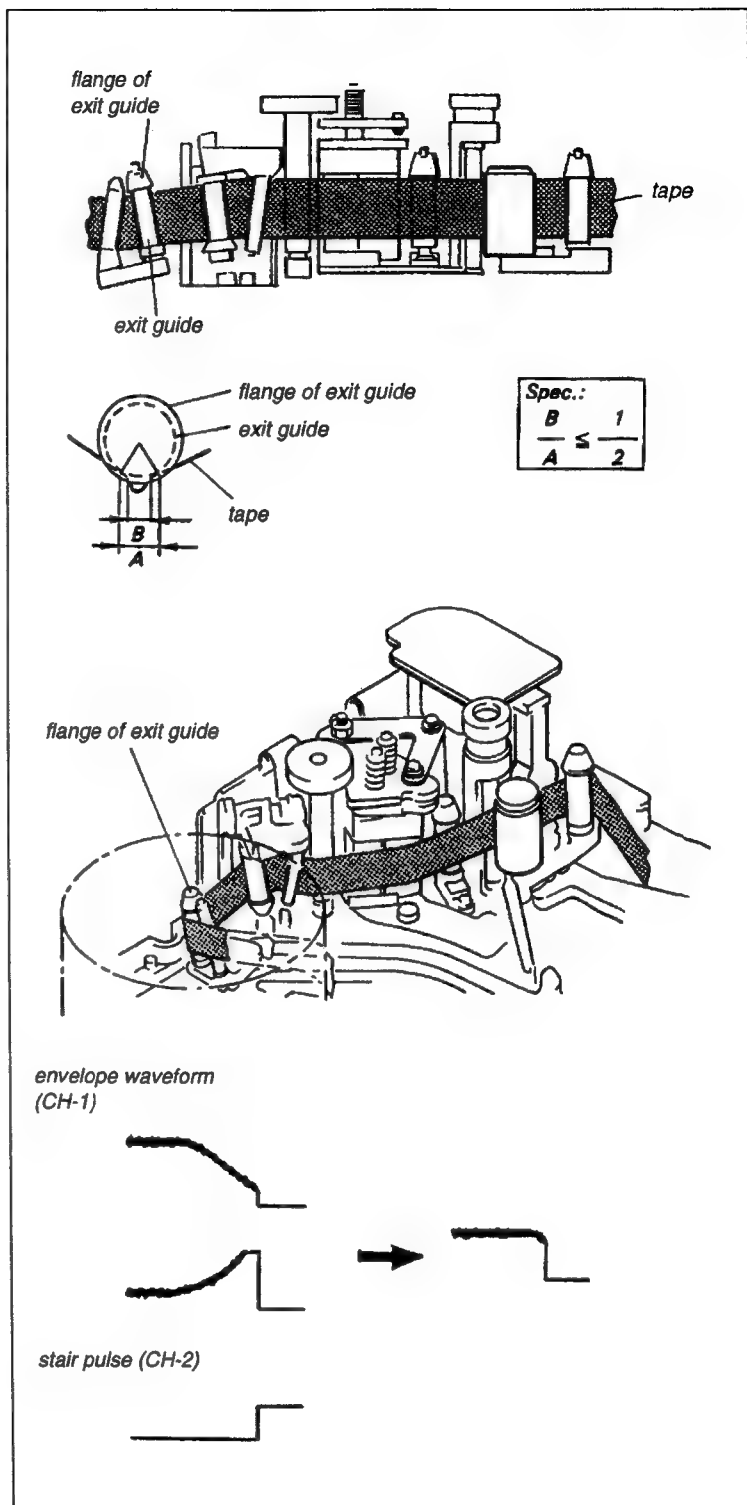


Adjustment procedure:

- (1) Connect the oscilloscope as follows:
CH-1: TP33 / Extension Board
CH-2: TP25 / Extension Board
TRIG: TP25 / Extension Board
 - (2) Insert the alignment tape CR2-1B/1BPS and put the unit into the PLAY mode.
 - (3) Push the (-) button of the tracking control on the servo remote control tool so that the RF envelope waveform is made 70 to 80% of the maximum amplitude.
- To make a tracking adjustment at entrance side, perform Steps (4) through (8) plus Steps (14) and after. To make a tracking adjustment at exit side, perform Steps (9) through (13) plus Steps (14) and after.
- (4) Loosen the Upper Flange Locking Screw of the Entrance Guide by one or two turns with the tape guide adjustment driver.
 - (5) Turn the upper flange of the Entrance Guide with the tape guide adjustment driver and adjust so that the required specifications below are satisfied.
 - (i) Adjust the RF envelope waveform at entrance side in sequence of Fig.1, Fig.2, and Fig.3.
 - (ii) No tape curl occurs at the upper flange of the Entrance Guide.
 - (iii) The tape touches the lead at the drum entrance side.
 - (6) Tighten the Upper Flange Locking Screw of the Entrance Guide with the tape guide adjustment driver.
 - (7) Put the unit into the EJECT and PLAY modes two or three times and confirm that the required specifications in Step (5) are satisfied.



- (8) When raised the mechanical deck with the cassette tape in the upper position and the drum in the lower position, check that the RF envelope waveform at the entrance side meets the required specification.
- (9) Loosen the Upper Flange Locking Screw of the Exit Guide by one or two turns with a tape guide adjustment driver.
- (10) Turn the upper flange of the Exit Guide with the tape guide adjustment tool and adjust so that the required specifications below are satisfied.
 - (i) The RF envelope waveform at exit side make flat.
 - (ii) No tape curl occurs at the upper flange of the Exit Guide.
 - (iii) The tape touches the lead at the drum exit side.
- (11) Tighten the Upper Flange Locking Screw of the Exit Guide with the tape guide adjustment driver.
- (12) Repeat the EJECT and PLAY modes two or three times and confirm that Step (10) is satisfied.
- (13) When raised the mechanical deck with the cassette tape in the upper position and the drum in the lower position, confirm that the RF envelope waveform at the exit side meets the required specification.
- (14) Connect the oscilloscope as follows:
 CH-1: TP31 / Extension Board
 CH-2: TP25 / Extension Board
 TRIG: TP25 / Extension Board
- (15) When pushed the (+) or (-) button of the tracking control on the servo remote control tool, confirm that the RF envelope waveform is increased or decreased in a flat level.
- (16) Perform the adjustments as follows:
 Sec 6-1 Tape Path Adjustment (Play Mode)
 Sec 6-2 Tape Path Check (FF and REW Mode)



6-9. CTL HEAD HEIGHT ADJUSTMENT

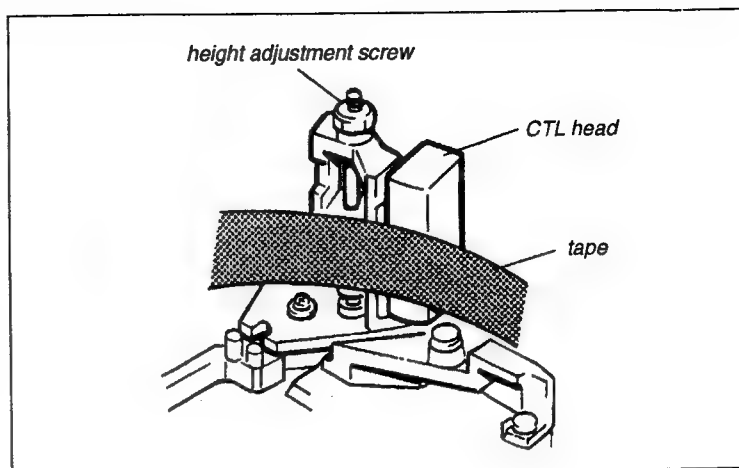
Tool: Alignment tape without a lid (CR8-1A/1APS)
Oscilloscope
Extension Board EX-148

Setting: (1) Extend the SV-97A/97AP Board with the extension board.
(2) Connect the oscilloscope as follows:
CH-1:TP38 / Extension Board

Mode: Play back the alignment tape.

Adjustment procedure:

- (1) Playback a 1 kHz audio signal which is recorded on the CTL track of the alignment tape.
- (2) Turn the height adjustment screw so that the output waveform is maximized.



6-10. CTL HEAD POSITION ADJUSTMENT

- The drum mounts four video heads for Y and C heads, respectively. The CTL head position adjustment is made with channel 1 of the Y head as reference.

Tool: Alignment tape without a lid (CR2-1B/1BPS)
Oscilloscope
Extension Board EX-148
Servo remote control tool

Setting: (1) Extend the VP-24/24P Board with the extension board.
(2) Connect the connector of the servo remote control tool to the CN2 of the SV-97A/97AP Board.
(3) Connect the oscilloscope as follows:
CH-1: TP33 / Extension Board
CH-2: TP25 / Extension Board
TRIG: TP25 / Extension Board

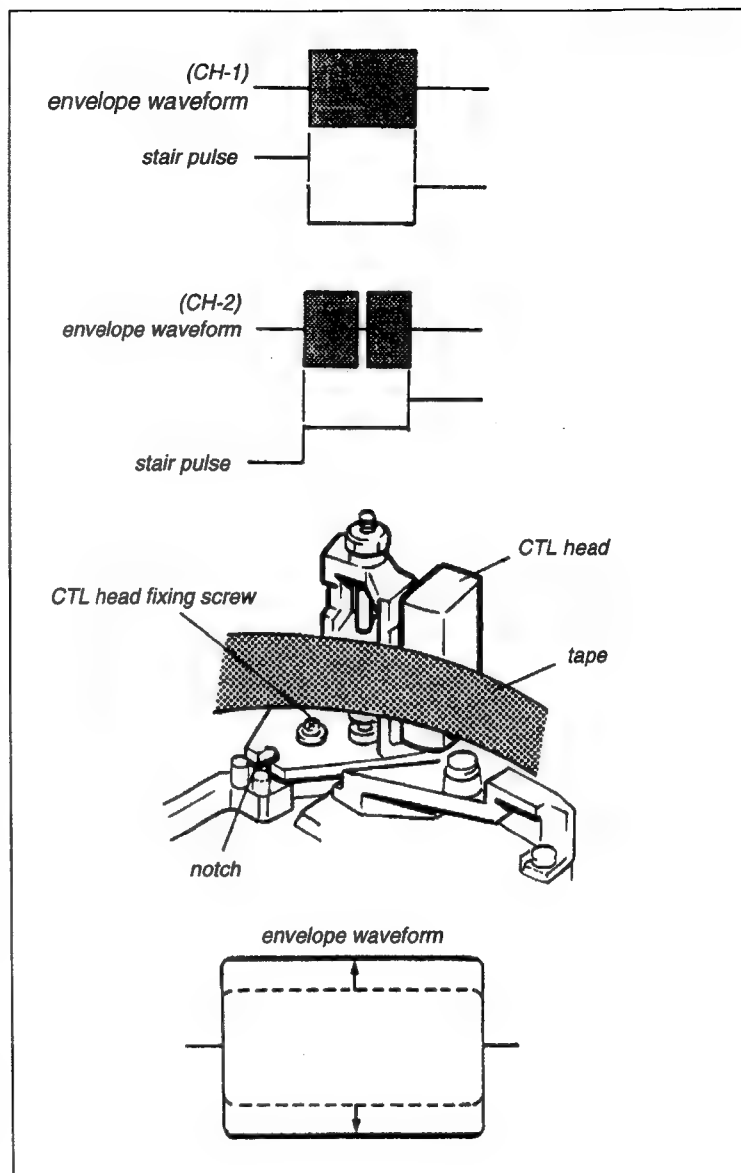
Mode: Play back the alignment tape.

Check procedure:

- Insert the alignment tape CR2-1B/1BPS and put the unit into the PLAY mode.
- When pushed the (+) or (-) button of the tracking control on the servo remote control tool, confirm that the RF envelope waveform is decreased. (Perform the adjustment if the output waveform is increased.)
- Confirm that the relationship between the switching pulse and RF envelope waveform meets the required specification.

Adjustment procedure:

- Remove the servo remote control tool.
- Loosen the fixing screw of CTL head by 1/2 turn.
- Insert a flatblade 3mm screwdriver into the notch of the CTL Head Mounting Bracket and adjust the CTL head position so that the RF envelope waveform is maximum.
- Tighten the CTL head fixing screw.
- Check according to the check procedure.



6-11. AUDIO HEAD ZENITH ADJUSTMENT

Tool: Flatness plate

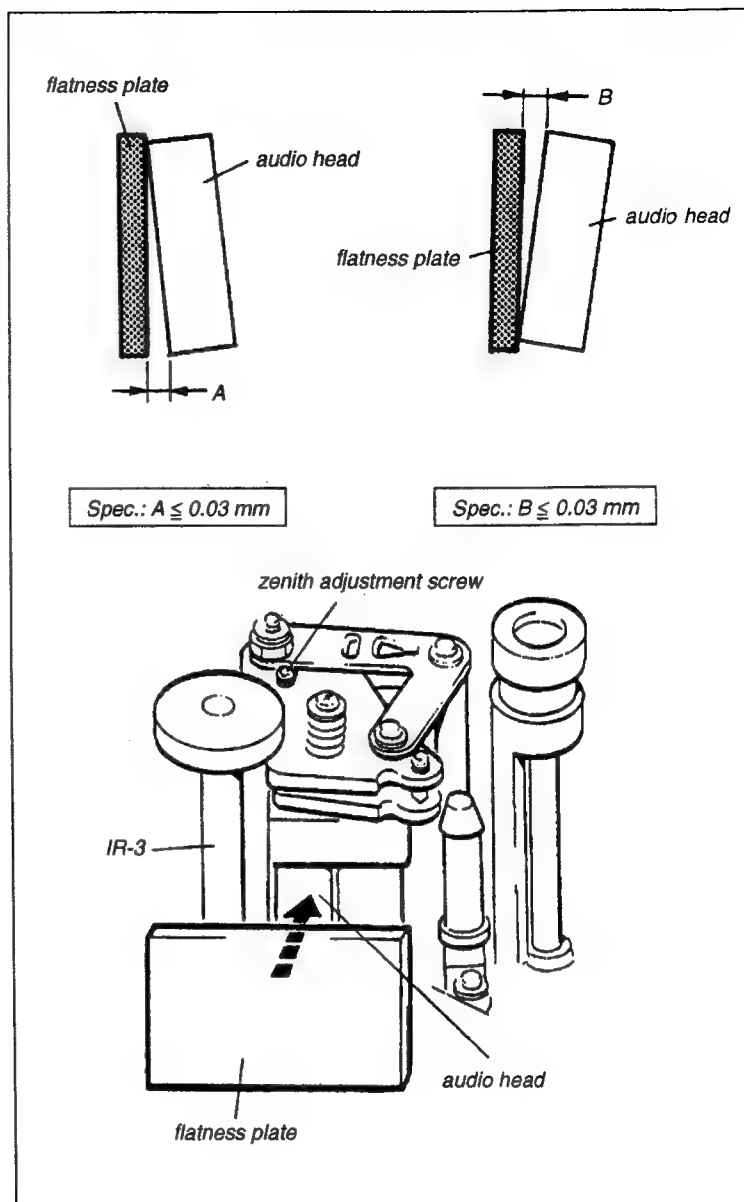
Mode: EJECT mode

Check procedure:

- (1) Put the flatness plate onto the IR-3 guide and audio head.
- (2) When the flatness plate is pressed onto the IR-3 guide, confirm that the clearance between the flatness plate and audio head meets the required specification.

Adjustment procedure:

- (1) Adjust the Zenith Adjustment Screw so that the specification is satisfied.
- (2) Adjust as follows:
 - Sec 6-14 Audio Head Phase Adjustment
 - Sec 6-12 TC Head Position Adjustment
 - Sec 6-13 Audio Head Height Adjustment
 - Sec 6-12 TC Head Position Adjustment



6-12. TC HEAD POSITION ADJUSTMENT

Tool: Alignment tape without a lid (CR2-1B/1BPS)

Extension Board EX-148

Setting: (1) Extend the SV-97A/97AP Board with the extension board.
(2) Connect the oscilloscope as follows:
CH-1: TP38 / Extension Board (CTL waveform)
CH-2: TP2 / TB-5 Board (TC waveform)
TRIG: TP20 / Extension Board (1/2 VD)

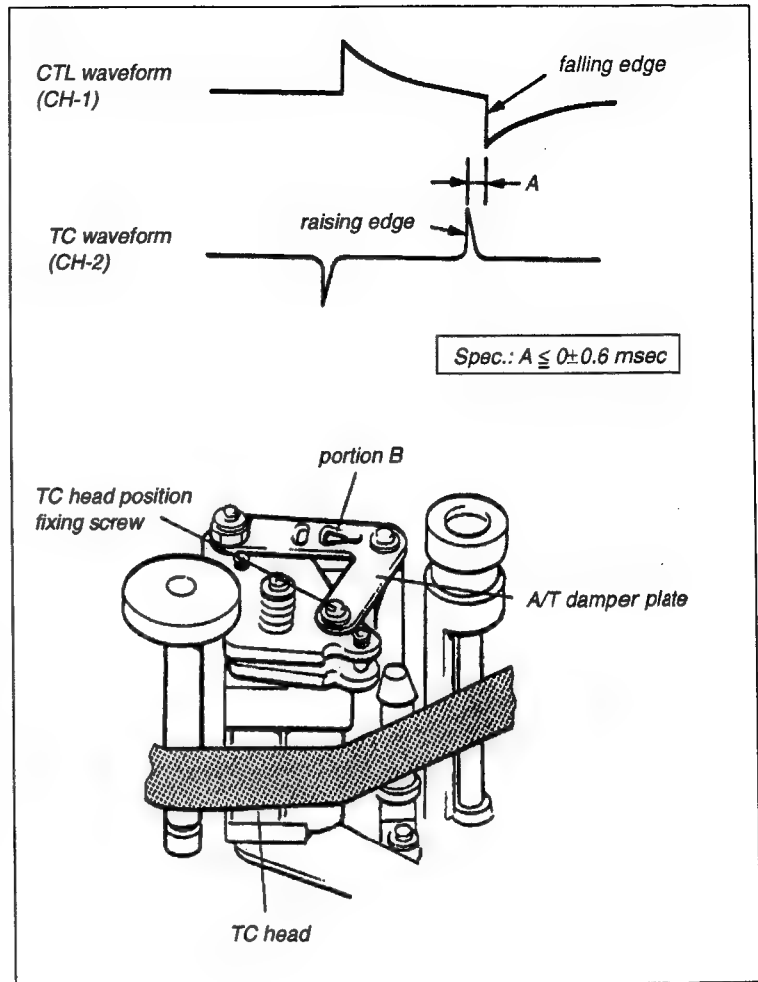
Mode: Play back the alignment tape.

Check procedure:

- (1) Insert the alignment tape CR2-1B/1BPS and put the unit into the PLAY mode.
- (2) Confirm that the relationship between the phase at the falling edge of the CTL waveform and that at the raising edge of the TC waveform meets the required specification.

Adjustment procedure:

- (1) Loosen the TC Head Position Fixing Screw by one or two turns.
- (2) Insert a flatblade 3mm screwdriver into portion B of the A/T Damper Plate and adjust the TC head position so that the required specification is satisfied.
- (3) Tighten the TC Head Position Fixing Screw and recheck.



6-13. AUDIO HEAD HEIGHT ADJUSTMENT

Tool: Alignment tape without a lid (CR8-1A/1APS)
Extension Board EX-148

Setting: (1) Extend the AU-97/97P Board with the extension board
(2) Connect the oscilloscope as follows:
CH-1: TP105 / AU-97/97P Board
CH-2: TP205 / AU-97/97P Board

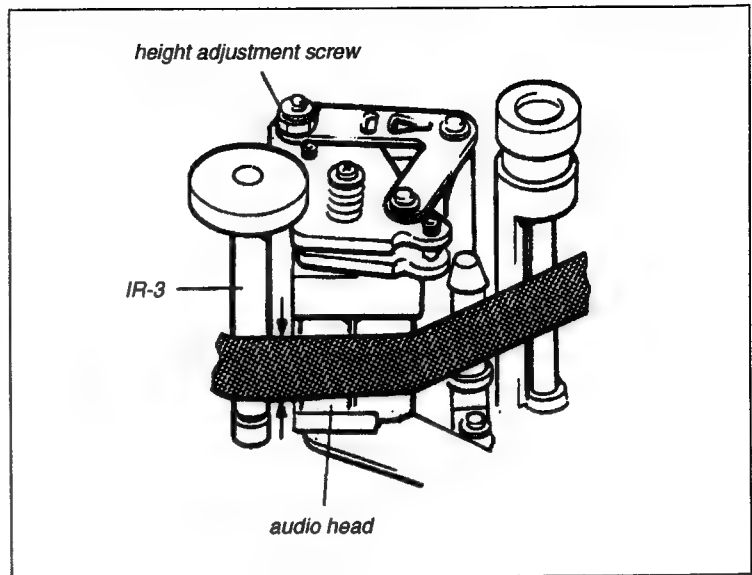
Mode: Play back the alignment tape.

Check procedure:

- (1) Play back an 1 kHz/0 dB audio signal on the alignment tape.
- (2) When pushing up and pressing down the tape of the illustrated portion between the audio head and IR-3 Guide, confirm that the output waveform is decreased without increasing. (Perform the adjustment when the output waveform is increased.)

Adjustment procedure:

- When the output waveform is increased by pushing up the tape.
 - (1) Turn the Height Adjustment Screw clockwise so that the output waveform is maximum.
- When the output waveform is increased by pressing down the tape.
 - (2) Turn the Height Adjustment Screw counterclockwise so that the output waveform is maximum.



6-14. AUDIO HEAD PHASE ADJUSTMENT

Tool: Alignment tape without a lid (CR8-1A/1APS)
Extension Board EX-148

Setting:

- (1) Extend the AU-97/97P Board with the extension board.
- (2) Connect the horizontal and vertical terminals of the oscilloscope to TP105 and TP205 on the AU-97/97P Board.
- (3) Play back an 1 kHz audio signal on the alignment tape.
- (4) Adjust the oscilloscope for horizontal and vertical amplitudes to 6cm of a lissajous waveform.

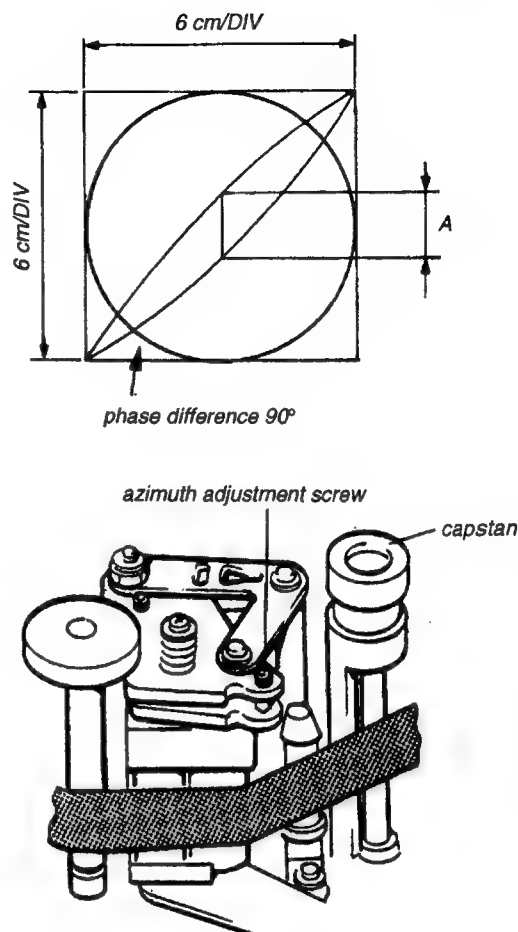
Mode: Play back the alignment tape.

Check procedure:

- (1) Play back an 1 kHz audio signal on the alignment tape.
- (2) Confirm that the phase difference meets the required specification.
- (3) Play back a 10 kHz/-10 dB audio signal on the alignment tape.
- (4) Confirm that the phase difference meets the required specification.

Adjustment procedure:

- (1) Play back 1 kHz and 10 kHz audio signals on the alignment tape.
- (2) Adjust the Azimuth Adjustment Screw so that both specifications are satisfied.



Spec.: 1 kHz: $A \leq 0.52 \text{ cm } (\text{°})$
10 kHz: $A \leq 0.52 \text{ cm } (\text{°})$

6-15. PB SWITCHING POSITION ADJUSTMENT

Tool: Alignment tape, CR2-1B/1BPS
Two EX-148 extension boards

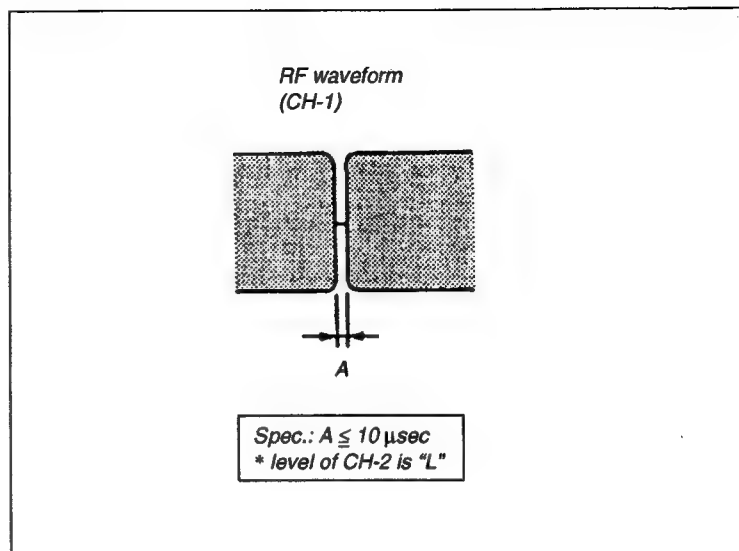
Setting:

- (1) Set the S1/VP-24/24P to the OFF position.
- (2) Extend the SV-97A/97AP board with an extension board.
- (3) Extend the VP-24/24P board with an extension board.
- (4) Connect the oscilloscope as follows:
CH-1: TP33/Extension board (VP-24/24P)
CH-2: TP10/Extension board (SV-97A/97AP)
TRIG: TP20/Extension board (SV-97A/97AP)

Mode: Play back the alignment tape.

Adjustment procedure:

- (1) Adjust the RV4/SV-97A/97AP so that the portion A of the CH-1 waveform is minimized during the level of CH-2 is "L".
- (2) Adjust the RV3/SV-97A/97AP so that the specification is satisfied. If the level of CH-2 is "H", perform step (1) again.
- (3) After the adjustment is completed, set the S1/VP-24/24P to the ON position.



6-16. BRUSH ADJUSTMENT

6-16-1. Brush Position Adjustment

Mode: EJECT

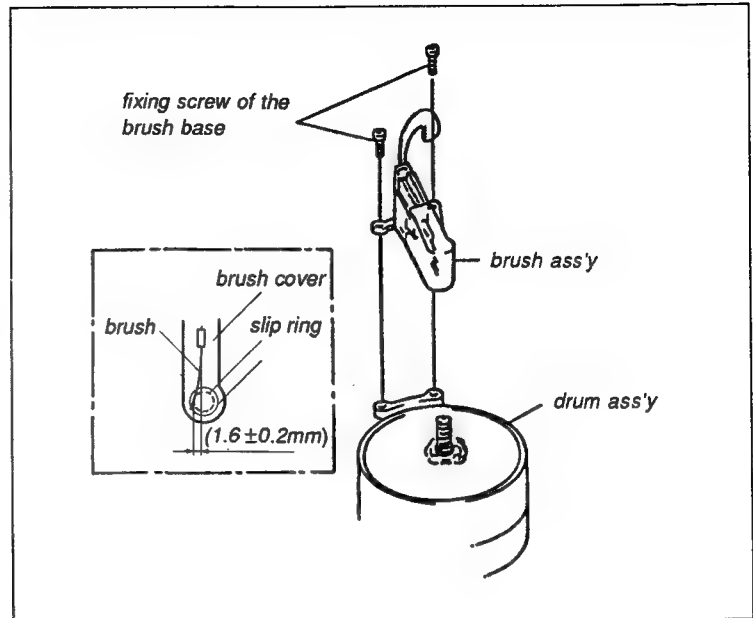
Check procedure:

Confirm that the slip ring and the brush are in the following status when viewed from top.

- (1) Make sure that the brush is positioned as shown in the illustration with reference to the slip ring.
- (2) Make sure that the slip ring is placed at the center of moldline on the brush cover.

Adjustment procedure:

- (1) Loosen the two fixing screws of the Brush Base, and adjust the position of the brush base so that the specification is satisfied.



6-16-2. Brush Height Adjustment

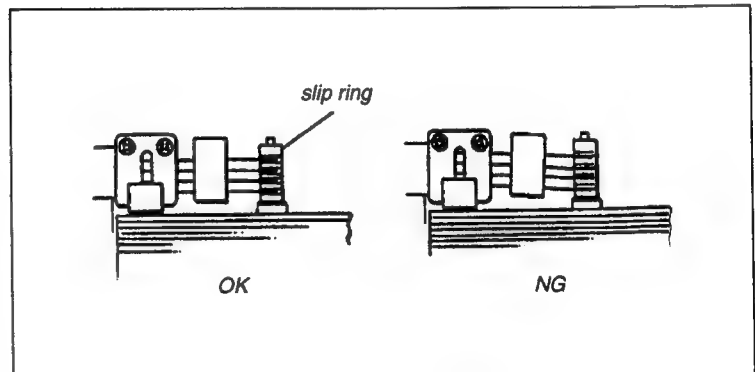
Mode: EJECT

Check procedure:

- (1) Confirm that the Brush is parallel to the Slip Ring Groove.

Adjustment procedure:

- (1) Remove the Brush Base from the unit as described in Sec. 6-16-1. Brush Position Adjustment.
- (2) Remove the Brush Cover from the Brush Base.
- (3) Install the Brush Base on the unit, and loosen the two fixing screws of the Brush Base and adjust so that the specification is satisfied.
- (4) After adjustment, install the Brush Cover and adjust the brush position as described in Sec. 6-16-1.

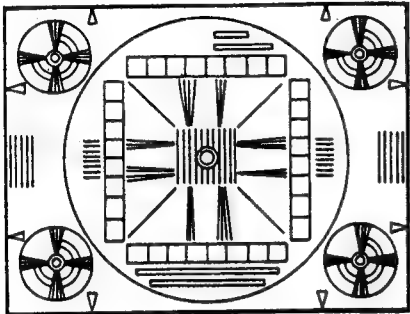
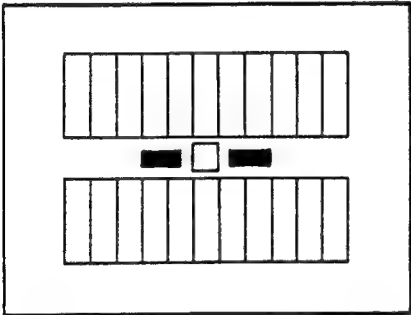
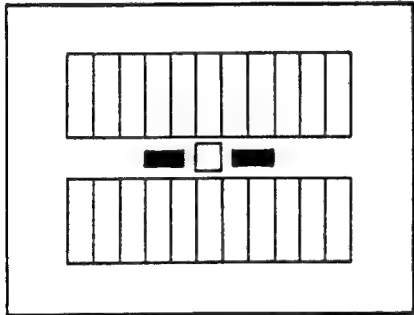
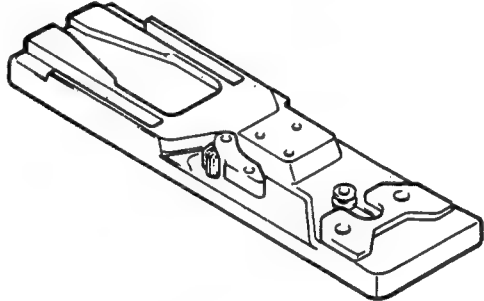
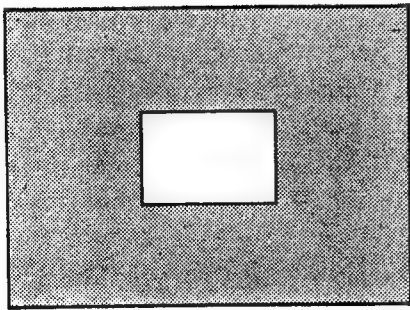
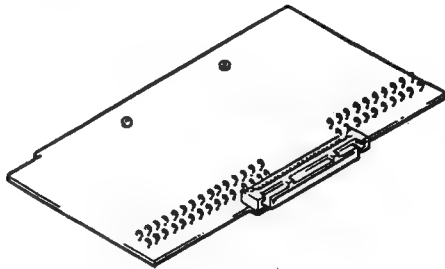


SECTION 7

CAMERA SYSTEM ALIGNMENT

7-1. PREPARATION

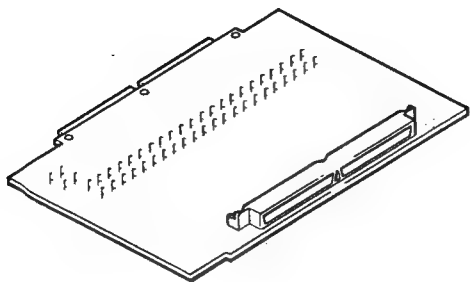
7-1-1. Tools and Measuring Instruments

J-6026-100-A	Resolution Chart
	
J-6026-130-B	Gray scale chart
<p>Affix the pieces of black velvet at both sides of the center white mark so that on light peeps.</p> 	
White window chart	
<p>Make a square hole at the center of a black sheet of paper.</p> 	
J-6029-140-B	Pattern Box PTB-500 (90 to 240 VAC)
	
Tripod adaptor (VCT-14)	
<p>Supplied with BVW-D600/D600P.</p> 	
A-7520-314-A	Extension board (EX-148)
<p>Supplied with BVW-D600/D600P.</p> 	

A-8276-725-A

Extension board (EX-406)

Supplied with BVW-D600/D600P.



- AC adaptor (Sony AC-550/550CE) or batteries (NP-1A and NP-1B)

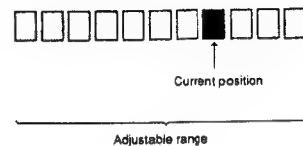
[Equipments]

- Oscilloscope
- Waveform monitor
- Vectorscope
- Frequency counter
- Digital voltmeter
- Black-and-white monitor
(with a horizontal resolution of 900 TV lines or more)
- Color monitor
- Low-frequency oscillator
- SC-H Phase measuring instrument

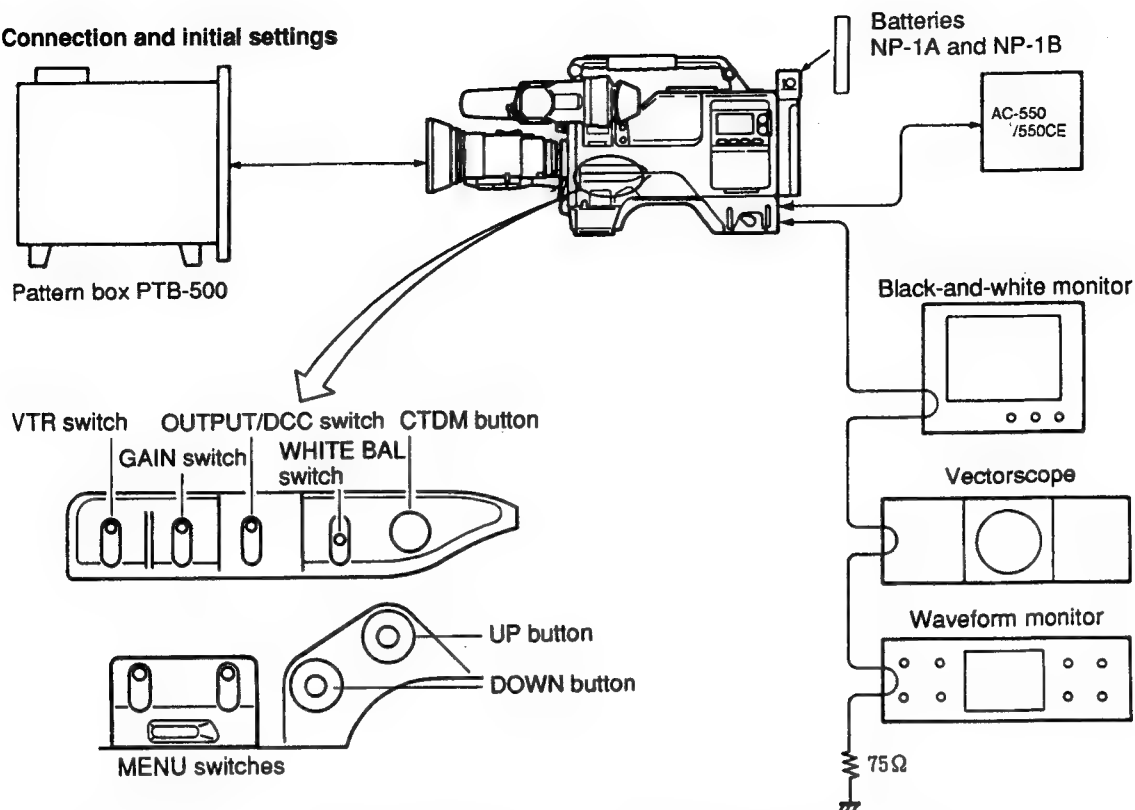
Indication at the top right of the viewfinder screen

In adjustment on the setting menu, a bar sometimes appears at the top right of the viewfinder screen. As shown below, the bar indicates the current setting and valid range for the selected item.

*LEVEL	1/9	■■■■■■■■■■
▷ DETAIL LEVEL :	0	
V DTL LEVEL :	0	
H DTL FREQ. :	0	
V DTL BLK CLIP :	0	
DTL WHT CLIP :	0	
DTL BLK CLIP :	0	
CRISPING :	0	
LEVEL DEPEND :	0	
KNEE APERTURE :	0	
APERTURE LEVEL :	0	



7-1-2. Connection and initial settings



- When the optional playback adaptor (VA-500/500P) is connected, take the VBS output from the TEST OUT BNC connector at the side.
- The VBS signal output to the connector of the playback adaptor, the VBS signal output to pin 26 of the optional BKW-402, and the VIDEO OUT (rear panel) signal are the same. When the playback adaptor is connected, do not use the signal at pin 26 of the BKW-402 or the VIDEO OUT signal irrespective of 75-ohm termination because they cannot be driven at the same time. Even when the signal output to pin 26 is connected to a VCR, use the TEST OUT signal, which is independently output.

I	VIDEO OUT
	Playback adaptor (pin 20)
	BKW-402 (pin 26)
II	TEST OUT
	REMOTE (pin 6)

Only one signal can be used at a time for each group (I or II)

- Before adjustment, set the external main power switch to POWER ON and the VTR switch to SAVE, then warm up the camera for about 10 minutes.

Notes on replacing the CCD unit

After replacing the CCD unit, perform the following adjustment.

- 7-7. VA gain adjustment
- 7-8-1. Black shading adjustment
- 7-8-2. White shading adjustment
- 7-11. Flare adjustment

7-1-3. Adjustment notes

1. Note on extending a printed circuit board

Be sure to set the external main power switch to POWER OFF before extending a printed circuit board.

2. Initial settings for switches

Before adjustment, set switches as follows. If the setting of the GAIN switch is changed from the factory-set value, reset it to its original value by referring to the operation manual.

[External]

Side panel:	VTR SAVE/STBY switch	→ STBY
	GAIN switch	→ L(0dB)
	OUTPUT/DCC switch	→ CAM/OFF
	WHITE BAL switch	→ PRST
	MENU ON/OFF/PAGE switch	→ OFF
Front panel:	SHUTTER switch	→ OFF
	FILTER selector	→ 1, B

[Lens]

LENS	→ MANU
IRIS	→ C

[Internal]

AT-75 board:	S1	→ ENG
	Note: Set S1 before turning on the power switch.	
	S2	→ All off
	S3	→ Back up
SET UP MENU:	GAIN	→ 0/9/18
	TEST OUT	→ ENC
	DETAIL	→ ON
	SKIN TONE	→ OFF
	MATRIX	→ OFF
	GAMMA	→ ON
	CHROMA	→ ON
	TEST SAW	→ OFF
	GENLOCK	→ ON
	CAM RET.	→ OFF
	FILTER INH.	→ ON
	VTR MODE	→ PAR.
	EXT VTR IND.	→ ON
	26P IF	→ OFF
	KNEE	→ ON
	WHITE CLIP	→ ON
	GAMMA	→ A
	I	→ ON (for BVW-D600)
	Q	→ ON (for BVW-D600)
	R-Y	→ ON (for BVW-D600P)
	B-Y	→ ON (for BVW-D600P)
	Note: After all adjustment, set the SET UP MENU as follows.	
	FILTER INH.	→ OFF

3. Variable resistors difficult to adjust

Do not change the settings of the following variable resistors.

Those resistors are difficult to adjust.

VA-128 board: ○CT101	AD-83 board: ○S1	DA-66 board: ○RV2
○CT201	○S2	VF-56 board: ○RV10
○CT301	○S3	

7-1-4. Adjustment items

7-2. ENC OUT adjustment

- 7-2-1. EN gain adjustment
- 7-2-2. EN Y level adjustment
- 7-2-3. CHROMA adjustment
- 7-2-4. INT SC phase adjustment

7-3. VIDEO OUT adjustment

7-4. TEST RGB adjustment

7-5. Component Signal adjustment

- 7-5-1. VTR Y adjustment
- 7-5-2. VTR R-Y and B-Y adjustment

7-6. Test Saw adjustment

7-7. VA Gain adjustment

7-8. Shading adjustment

- 7-8-1. Black shading adjustment
- 7-8-2. White shading adjustment
- 7-8-3. Manual black shading adjustment (for reference)
- 7-8-4. Manual white shading adjustment (for reference)

7-9. Gamma Correction adjustment

7-10. Black set adjustment

7-11. Flare adjustment

7-12. Knee and White Clip adjustment

- 7-12-1. Manual knee and white clip adjustment
- 7-12-2. DCC knee adjustment

7-13. Detail Signal adjustment

- 7-13-1. Crispening adjustment
- 7-13-2. Level dependent adjustment
- 7-13-3. DTL frequency adjustment
- 7-13-4. H/V ratio adjustment
- 7-13-5. DTL level adjustment
- 7-13-6. Knee aperture adjustment
- 7-13-7. H DTL clip adjustment
- 7-13-8. V DTL clip adjustment

7-14. Zebra adjustment

7-15. Auto Iris adjustment

7-16. Audio Level adjustment

7-17. Viewfinder adjustment

- 7-17-1. Vertical hold adjustment
- 7-17-2. Horizontal hold adjustment
- 7-17-3. BRIGHT SET adjustment
- 7-17-4. Focus adjustment
- 7-17-5. Picture frame adjustment
- 7-17-6. HEATER voltage adjustment

7-2. ENC OUT adjustment

7-2-1. EN gain adjustment

- Setting

Equipment	Waveform monitor	board	
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- Preparation

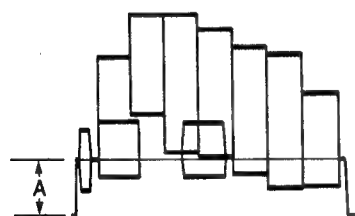
Connect a waveform monitor to the TEST OUT connector.

- Adjustment procedure

Adjustment point: Setting menu
Measurement point: TEST OUT connector

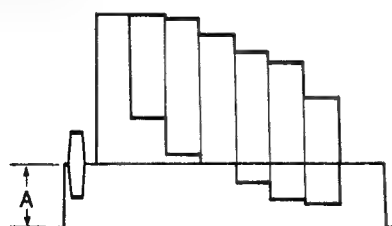
1. Set S1 (ENG/USR) to ENG on the AT-75 board.
2. Set the OUTPUT/DCC switch on the side panel to BARS.
3. Set the MENU ON/OFF/PAGE switch on the side panel to ON.
4. On the setting menu, set PAGE and ITEM as follows:
PAGE: D/A GAIN
ITEM: ENC GAIN
5. Adjust level A for the following specification by pressing the UP/DOWN button on the side panel.
 $A = 40 \pm 2$ IRE (for BVW-D600)
 $A = 300 \pm 10$ mV (for BVW-D600P)

BVW-D600



(Waveform monitor)

BVW-D600P



(Waveform monitor)

- Note

The gains for G-ch and B-ch will be automatically adjusted by performing this adjustment.

7-2-2. EN Y level adjustment

• Setting

Equipment	Waveform monitor	board	
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• Preparation

Connect a waveform monitor to the TEST OUT connector.

• Adjustment procedure

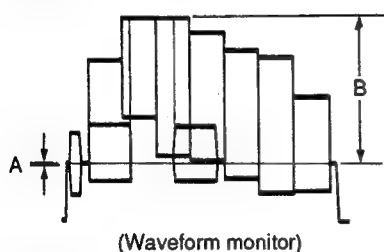
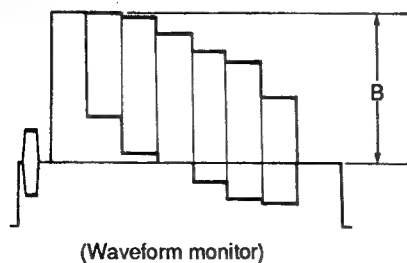
Adjustment point: Setting menu

Measurement point: TEST OUT connector

1. Set S1 (ENG/USR) to ENG on the AT-75 board.
2. Set the OUTPUT/DCC switch on the side panel to BARS.
3. Set the MENU ON/OFF/PAGE switch on the side panel to ON.

BVW-D600 only

4. On the setting menu, set PAGE and ITEM as follows:
PAGE: LEVEL 4/9
ITEM: ENC SETUP LEVEL
5. Adjust level A for the following specification by pressing the UP/DOWN button on the side panel.
A = 7.5 IRE
6. On the setting menu, set PAGE and ITEM as follows:
PAGE: LEVEL 4/9
ITEM: ENC Y LEVEL
7. Adjust level B for the following specification by pressing the UP/DOWN button on the side panel.
B = 100 ± 2 IRE (for BVW-D600)
B = 700 ± 10 mV (for BVW-D600P)

BVW-D600**BVW-D600P**

7-2-3. Chroma adjustment

- Setting

Equipment	Vectorscope	board	
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- Preparation

Connect a Vectorscope to the TEST OUT connector.

- Adjustment procedure

Adjustment point: Setting menu
Measurement point: TEST OUT connector

1. Set S1 (ENG/USR) to ENG on the AT-75 board.
2. Set the OUTPUT/DCC switch on the side panel to BARS.
3. Set the MENU ON/OFF/PAGE switch on the side panel to ON.

BVW-D600 only

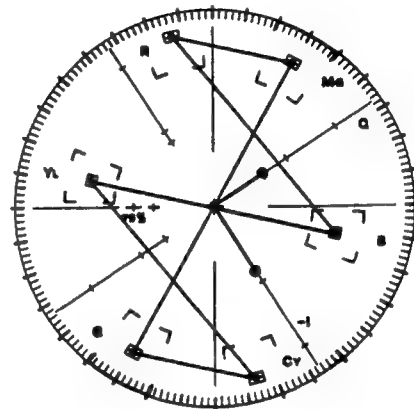
4. Position the I and Q highlight points on the I and Q axes respectively by turning the PHASE control of the vectorscope.
5. On the setting menu, set PAGE and ITEM as follows:
PAGE: LEVEL 4/9
ITEM: I CHROMA LEVEL (for BVW-D600)
Q CHROMA LEVEL (for BVW-D600)
R-Y CHROMA LEVEL (for BVW-D600P)
B-Y CHROMA LEVEL (for BVW-D600P)
6. Place the highlight points inside the corresponding frames on the vectorscope by pressing the UP/DOWN button on the side panel.
7. On the setting menu, set PAGE and ITEM as follows:
PAGE: LEVEL 4/9
ITEM: I BURST LEVEL (for BVW-D600)
Q BURST LEVEL (for BVW-D600)
R-Y BURST LEVEL (for BVW-D600P)
B-Y BURST LEVEL (for BVW-D600P)
8. Place the tip of the BURST signal indicator at the 75% position on the vectorscope by pressing the UP/DOWN button on the side panel.

For BVW-D600

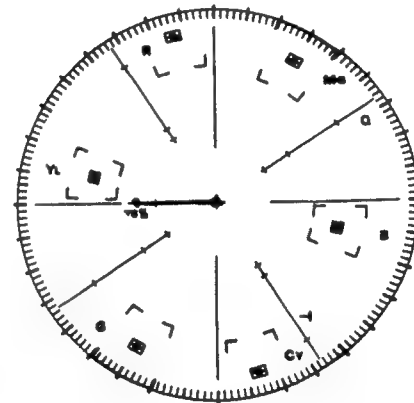
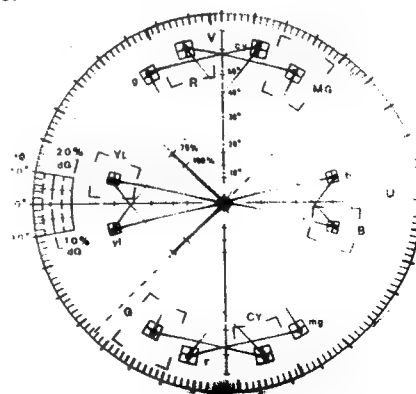
Position the I and Q highlight points on the I and Q axes respectively by turning the PHASE control of the Vectorscope.

For BVW-D600P

In this adjustment, the highlight points for colors go out of the corresponding frames. By turning the phase adjustment control of the vectorscope, place the points inside the corresponding frames, when necessary.

BVW-D600

(Vectorscope)

**BVW-D600P**

(Vectorscope)

7-2-4. INT SC PAHE adjustment

• Setting

Equipment	SC-H Phase measuring instrument	board	
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• Preparation

The procedure stated below applies to the adjustments where the Tektronix 1750 (for BVW-D600) or 1751 (for BVW-D600P) is used.
If any other measuring instrument is used, observe the instructions given in the operation manual attached to it.

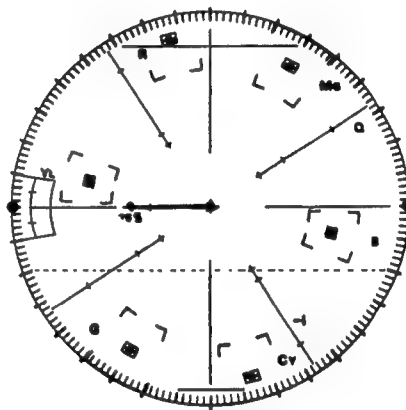
• Adjustment procedure

Adjustment point: Setting menu

Measurement point: TEST OUT connector

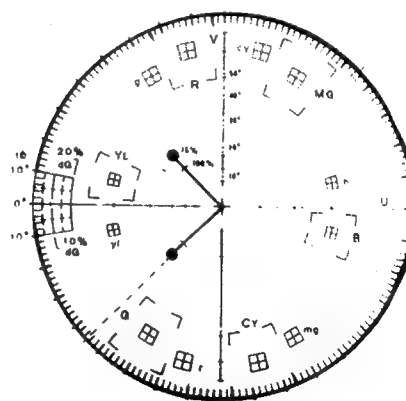
1. Set S1 (ENG/USR) to ENG on the AT-75 board.
2. Set the MENU ON/OFF/PAGE switch on the side panel to ON.
3. On the setting menu, set PAGE and ITEM as follows:
PAGE: TEST OUT
ITEM: ENC
4. On the setting menu, set PAGE and ITEM as follows:
PAGE: LEVEL 9/9
ITEM: SC-H
5. Position the luminous line of the burst (SC) and the luminescent spot of H properly by pressing the UP/DOWN button on the side panel.

BVW-D600



(SC-H Phase measuring instrument)

BVW-D600P



(SC-H Phase measuring instrument)

7-3. VIDEO OUT adjustment

- Setting

Equipment	Waveform monitor	board	IF-393/IF-393P board
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- Preparation

Connect a waveform monitor to the VIDEO OUT connector.

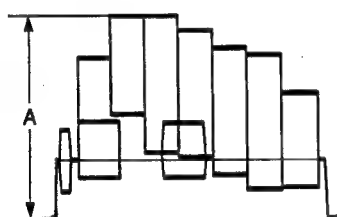
- Adjustment procedure

Adjustment point: **RV1**; IF-393/393P board

Measurement point: VIDEO OUT connector on the rear panel

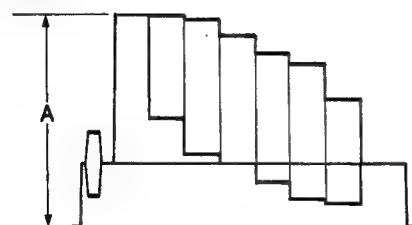
1. Set S1 (ENG/USR) to ENG on the AT-75 board.
2. Set the OUTPUT/DCC switch on the side panel to BARS.
3. Adjust level A for the following specification by adjusting variable resistor **RV1** on the IF-393/IF-393P board.
4. On the setting menu, set PAGE and ITEM as follows:
 $A = 140 \pm 5$ IRE (for BVW-D600)
 $A = 1000 \pm 50$ mV (for BVW-D600P)

BVW-D600

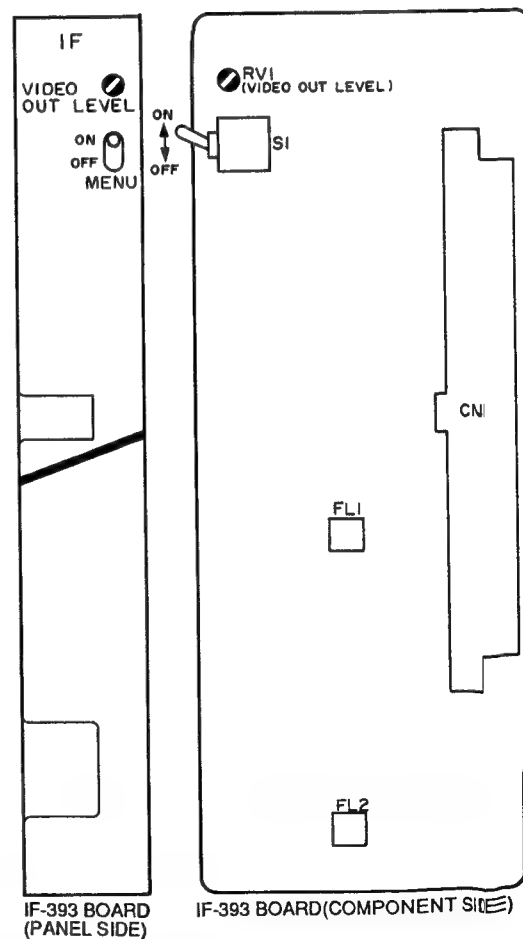


(Waveform monitor)

BVW-D600P



(Waveform monitor)



7-4. TEST RGB adjustment

• Setting

Equipment	Waveform monitor	board	
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• Preparation

Connect a waveform monitor to the TEST OUT connector.

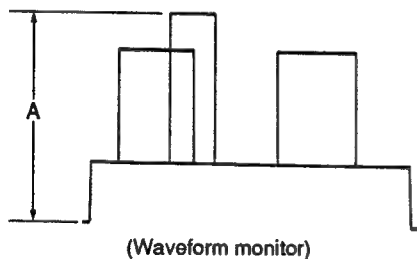
• Adjustment procedure

Adjustment point: Setting menu

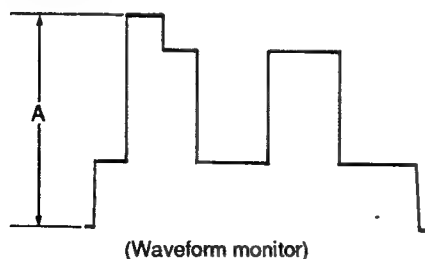
Measurement point: TEST OUT connector

1. Set S1 (ENG/USR) to ENG on the AT-75 board.
2. Set the OUTPUT/DCC switch on the side panel to BARS.
3. Set the MENU ON/OFF/PAGE switch on the side panel to ON.
4. On the setting menu, set PAGE and ITEM as follows:
PAGE: TEST OUT
ITEM: R
5. On the setting menu, set PAGE and ITEM as follows:
PAGE: D/A GAIN
ITEM: TEST RGB GAIN
6. Adjust level A for the following specification by pressing the UP/DOWN button on the side panel.
A = 140 ± 5 IRE (for BVW-D600)
A = 1000 ± 50 mV (for BVW-D600P)
7. On the setting menu, set PAGE and ITEM as follows:
PAGE: TEST OUT
ITEM: ENC

BVW-D600



BVW-D600P



7-5. Component Signal adjustment

7-5-1. VTR Y adjustment

• Setting

Equipment	Oscilloscope	board	DA-66 board
-----------	--------------	-------	-------------

• Preparation

Connect an oscilloscope to TP1 (Y) on the DA-66 board with the ground wire connected to E1.
On the setting menu, set PAGE and ITEM as follows:
PAGE: FUNCTION 2/2
ITEM: 26P IF (ON)

• Adjustment procedure

Adjustment point: Setting menu
●RV1 (VTR SYNC LVL); DA-66 board
Measurement point: TP1; DA-66 board

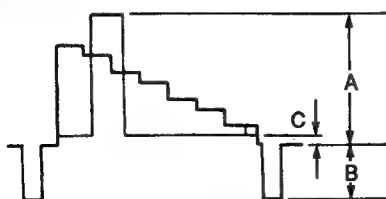
1. Set S1 (ENG/USR) to ENG on the AT-75 board.
2. Set the OUTPUT/DCC switch on the side panel to BARS.
3. Set the MENU ON/OFF/PAGE switch on the side panel to ON.

BVW-D600 only

4. On the setting menu, set PAGE and ITEM as follows:
PAGE: D/A GAIN
ITEM: VTR Y SETUP
5. Adjust level C to 53.5 ± 2 mV by pressing the UP/DOWN button on the side panel.

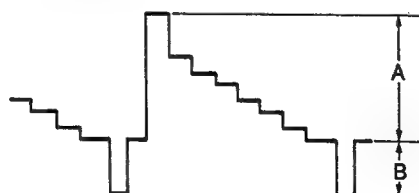
6. On the setting menu, set PAGE and ITEM as follows:
PAGE: D/A GAIN
ITEM: VTR Y GAIN
7. Adjust level A for the following specification by pressing the UP/DOWN button on the side panel.
A = 714 ± 10 mV (for BVW-D600)
A = 700 ± 10 mV (for BVW-D600P)
8. Adjust level B for the following specification by adjusting variable resistor ●RV1 (VTR SYNC LVL) on the DA-66 board.
B = 286 ± 10 mV (for BVW-D600)
B = 300 ± 10 mV (for BVW-D600P)

BVW-D600



(Waveform monitor)

BVW-D600P



(Waveform monitor)



DA-66 BOARD
(PANEL SIDE)

9. On the setting menu, set PAGE and ITEM as follows:
PAGE: FUNCTION 2/2
ITEM: 26P IF (OFF)

7-5-2. VTR R-Y and B-Y adjustment

• Setting

Equipment	Oscilloscope	board	DA-66 board
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• Preparation

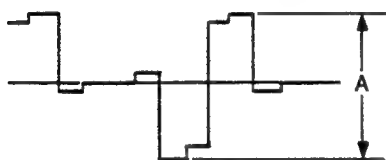
Connect an oscilloscope to TP2 (R-Y) on the DA-66 board. On the setting menu, set PAGE and ITEM as follows:
 PAGE: FUNCTION 2/2
 ITEM: 26P IF (ON)

• Adjustment procedure

Adjustment point: Setting menu

Measurement point: TP2 (R-Y); DA-66 board (GND: E1)
 TP3 (B-Y); DA-66 board (GND: E1)

1. Set S1 (ENG/USR) to ENG on the AT-75 board.
2. Set the OUTPUT/DCC switch on the side panel to BARS.
3. Set the MENU ON/OFF/PAGE switch on the side panel to ON.
4. On the setting menu, set PAGE and ITEM as follows:
 PAGE: D/A GAIN
 ITEM: VTR R-Y GAIN
5. Adjust level A for the following specification by pressing the UP/DOWN button on the side panel.
 $A = 700 \pm 10 \text{ mV}$ (for BVW-D600)
 $A = 525 \pm 5 \text{ mV}$ (for BVW-D600P)



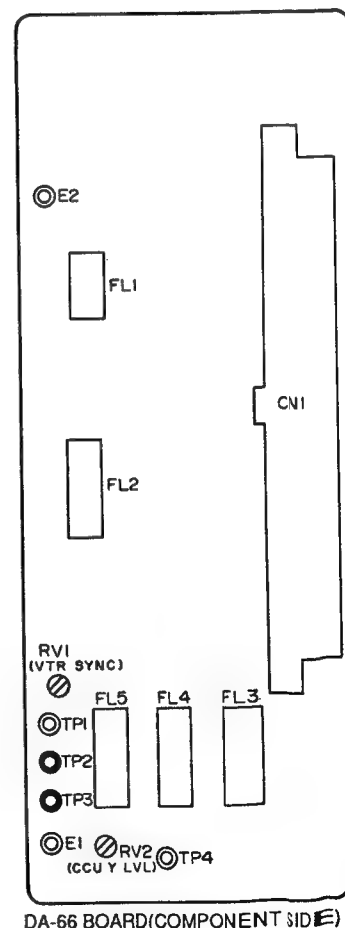
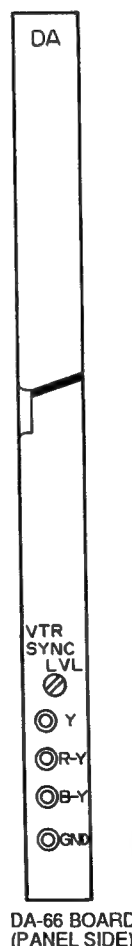
(Waveform monitor)

6. Connect the oscilloscope to TP3 (B-Y) on the DA-66 board.
7. On the setting menu, set PAGE and ITEM as follows:
 PAGE: D/A GAIN
 ITEM: VTR B-Y GAIN
8. Adjust level B for the following specification by pressing the UP/DOWN button on the side panel.
 $B = 700 \pm 10 \text{ mV}$ (for BVW-D600)
 $B = 525 \pm 5 \text{ mV}$ (for BVW-D600P)



(Waveform monitor)

9. On the setting menu, set PAGE and ITEM as follows:
 PAGE: FUNCTION 2/2
 ITEM: 26P IF (OFF)



7-6. Test Saw adjustment

• Setting

Equipment	Waveform monitor	board	VA-128 board
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• Preparation

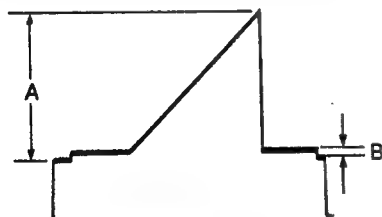
Connect a waveform monitor to the TEST OUT connector.

• Adjustment procedure

Adjustment point: **RV1 (TEST LEVEL)**; VA-128 board

Measurement point: TEST OUT connector

1. Set the OUTPUT/DCC switch on the side panel to CAM/ON.
2. Set the WHITE BAL switch on the side panel to PRST.
3. Set the MENU ON/OFF/PAGE switch on the side panel to ON.
4. On the setting menu, set PAGE and ITEM as follows:
PAGE: FUNCTION 1/2
ITEM: GAMMA (OFF)
5. Set the MENU ON/OFF/PAGE switch on the side panel to OFF.
6. Flip upward the ABB switch on the front panel.
7. Set the MENU ON/OFF/PAGE switch on the side panel to ON.
8. On the setting menu, set PAGE and ITEM as follows:
PAGE: LEVEL 3/9
ITEM: MASTER BLACK
9. Adjust level B for the following specification by pressing the UP/DOWN button on the side panel.
B = 0.4 IRE (for BVW-D600)
B = 2 mV (for BVW-D600P)
10. On the setting menu, set PAGE and ITEM as follows:
PAGE: FUNCTION 1/2
ITEM: TEST SAW (ON)
11. Adjust level A for the following specification by adjusting variable resistor **RV1 (TEST LEVEL)** on the VA-128 board.
A = 100 ± 2 IRE (for BVW-D600)
A = 700 ± 10 mV (for BVW-D600P)



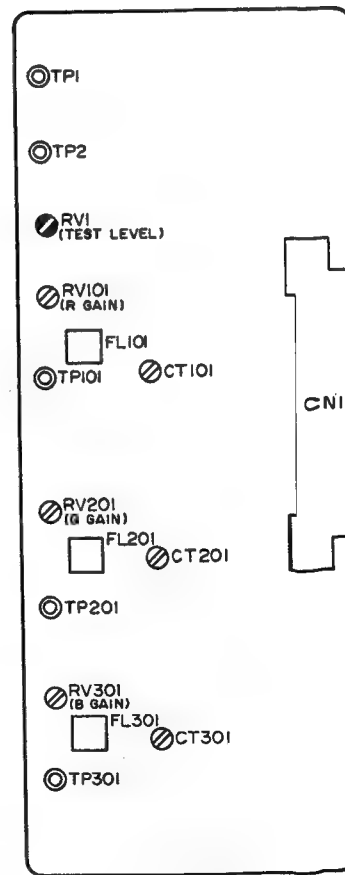
(Waveform monitor)

12. On the setting menu, set PAGE and ITEM as follows:
PAGE: FUNCTION 1/2
ITEM: GAMMA (ON)

13. TEST SAW OFF



VA-128 BOARD
(PANEL SIDE)



VA-128 BOARD (COMPONENT SIDE)

7-7. VA Gain adjustment

• Setting

Equipment	Waveform monitor, Oscilloscope	board	VA-128 board
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• Note

Use a reflective chart in this adjustment, if possible. Adjust the color temperature to 3200k exactly. If a pattern box is used, check its state before use. Adjust the illumination of chart for 2000 lx.

• Preparation

Connect a waveform monitor to the TEST OUT connector. Shoot the gray-scale chart as large as possible on the screen. Set the WHITE BAL switch to PRST. To be extended; VA-128 board.

• Adjustment procedure

Adjustment point: \odot RV101 (R GAIN); VA-128 board

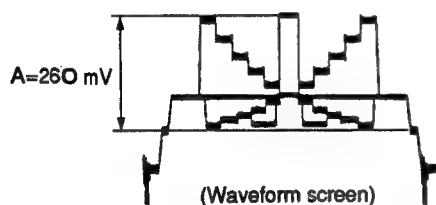
\odot RV201 (G GAIN); VA-128 board

\odot RV301 (B GAIN); VA-128 board

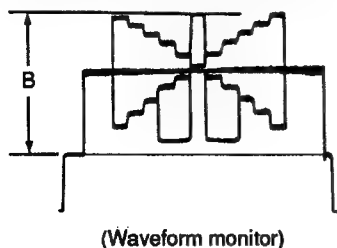
Measurement point: TEST OUT connector

Object: Gray-scale chart

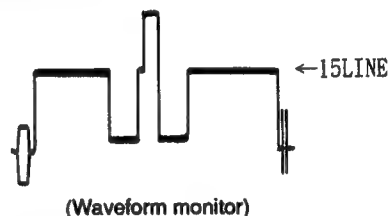
- Set the OUTPUT/DCC switch on the side panel to CAMON.
- Press down the AUTO W/B switch on the front panel to perform the automatic black balance adjustment.
- Connect the oscilloscope to TP7(G(X) IN); extension board. Adjust the iris control so that the level A is 260 mV.



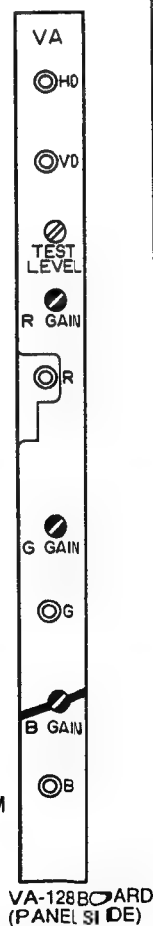
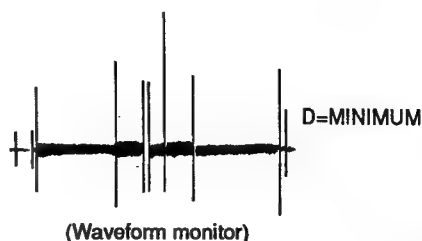
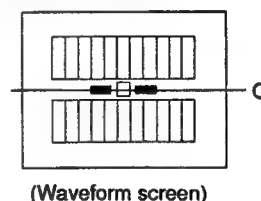
- Set the MENU ON/OFF/PAGE switch on the side panel to ON.
- On the setting menu, set PAGE and ITEM as follows:
PAGE: TEST OUT
ITEM: G
- Adjust level A for the following specification by adjusting variable resistor \odot RV201 (G GAIN); VA-128 board.
B = 100 ± 2 IRE (for BVW-D600)
B = 700 ± 10 mV (for BVW-D600P)



- On the setting menu, set PAGE and ITEM as follows:
PAGE: TEST OUT
ITEM: ENC
- Select 15 lines at portion C on the waveform monitor.



- Set the waveform monitor to the CHROMA mode.
- Minimize carrier leakage D by adjusting variable resistor \odot RV101 (R GAIN) and \odot RV301 (B GAIN) on the VA-128 board.



7-8. Shading adjustment

If the auto-shading adjustment stops on the way of operation, push the MENU CANCEL/PRST/ITEM switch to CANCEL/PRST and press the UP button of the unit. The operation will restart. IF the adjustment still can not, consult your Sony service representative.

7-8-1. Black shading adjustment

• Note

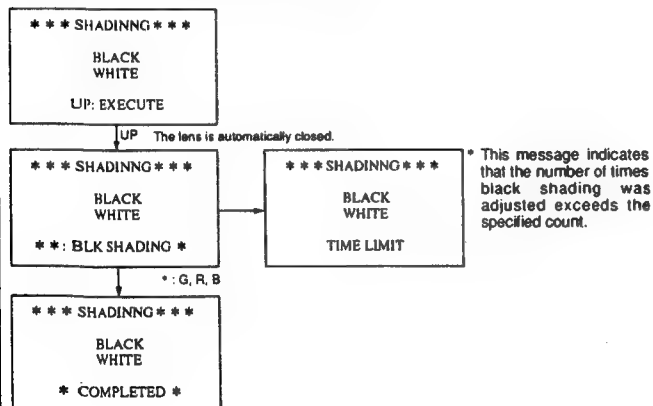
This adjustment is not required when white shading (described in 7-8-2) is adjusted.

• Adjustment procedure

Adjustment point: Setting menu

1. IRIS → C
2. On the setting menu, set PAGE and ITEM as follows:
PAGE: SHADING
ITEM: BLACK
3. Perform the automatic black shading adjustment by pressing the UP button on the side panel.

◆ Initial screen (for black shading adjustment)



7-8-2. White shading adjustment

If the auto-shading adjustment is bailed, it is considered that several conditions such as an uneven white pattern luminance, lens iris and lens zoom are not good.

When the error occurs, first check whether the above conditions are good or not looking in the viewfinder screen.

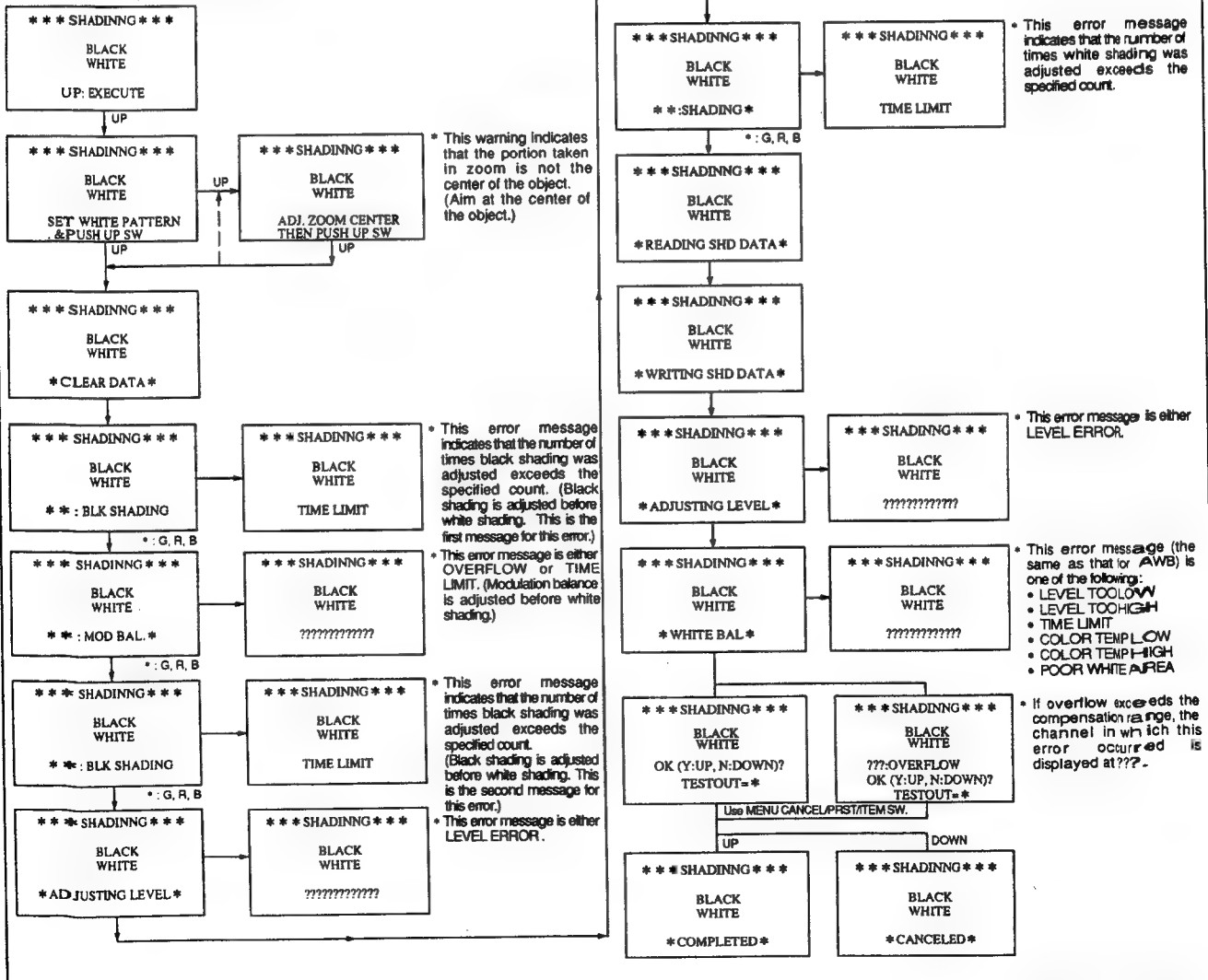
• Adjustment procedure

Adjustment point: Setting menu

Object: Pattern box (Fully occupied white area)

1. Connect the lens connector to the LENS connector.
Set the lens aperture to AUTO.
2. Using the zoom lens, shoot the fully occupied white area of pattern box in a full picture frame.
3. On the setting menu, set PAGE and ITEM as follows:
PAGE: AUTO SHADING
ITEM: WHITE
4. Perform the automatic white shading adjustment by pressing the UP button on the side panel.
5. Set the EXTENDER switch to X2.
6. Repeat procedure 1 through 4.
7. Set the EXTENDER switch to X1.

◆ Initial screen (for black shading adjustment)



7-8-3. Manual black shading adjustment (for reference)

- Setting

Equipment	Waveform monitor	board	
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- Preparation

Connect a waveform monitor to the TEST OUT connector.

- Adjustment procedure

LENS IRIS: Close
 Adjustment point: Setting menu (LEVEL 7/9)
 (R) BLK R-H SAW
 BLK R-V SAW
 (G) BLK G-H SAW
 BLK G-V SAW
 (B) BLK B-H SAW
 BLK B-V SAW

Measurement point: TEST OUT connector

1. Set the waveform monitor to LUM mode. Set the VOLT FULL SCALE range to 0.5.
2. On the setting menu, set PAGE and ITEM as follows:
 PAGE: TEST OUT
 ITEM: R
3. If shading exists, select a setting menu and item according to the table below and make the waveform flat by pressing the UP/DOWN button on the side panel.
4. Adjust shading for G and B channels in the same way.
5. After the adjustment, set PAGE and ITEM as follows in the setting menu.
 PAGE: TEST OUT
 ITEM: ENC

	Setting menu	H SAW	V SAW
R	P :TEST OUT I :R	P :LEVEL 7/9 I :BLACK R-H SAW	P :LEVEL 7/9 I :BLACK R-V SAW
G	P :TEST OUT I :G	P :LEVEL 7/9 I :BLACK G-H SAW	P :LEVEL 7/9 I :BLACK G-V SAW
B	P :TEST OUT I :B	P :LEVEL 7/9 I :BLACK B-H SAW	P :LEVEL 7/9 I :BLACK B-V SAW

TEST OUT connector



7-8-4. Manual white shading adjustment (for reference)

• Setting

Equipment	Waveform monitor	board	
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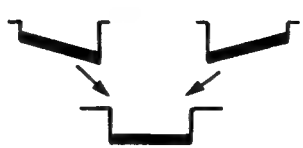
• Preparation

Connect a waveform monitor to the TEST OUT connector.

• Adjustment procedure

LENS IRIS: Close
 Adjustment point: Setting menu (LEVEL 6/9)
 (R) WHT R-H SAW
 WHT R-V SAW
 (G) WHT G-H SAW
 WHT G-V SAW
 (B) WHT B-H SAW
 WHT B-V SAW
 Measurement point: TEST OUT connector
 Object: White window chart
 lens zoom: Set the lens to TELE. Shoot the center of the white window chart on the screen.
 Lens IRIS: Adjust the white level as follows:
 100 \pm 2 IRE (BVW-D600)
 700 \pm 10 mV (BVW-D600P)

1. Set the waveform monitor to LUM mode. Set the VOLT FULL SCALE range to 0.5.
2. On the setting menu, set PAGE and ITEM as follows:
 PAGE: TEST OUT
 ITEM: R
3. If shading exists, select a setting menu and item according to the table below and make the waveform flat by pressing the UP/DOWN button on the side panel.
4. Adjust shading for G and B channels in the same way.
5. After the adjustment, set PAGE and ITEM as follows in the setting menu.
 PAGE: TEST OUT
 ITEM: ENC

	Setting menu	H SAW	V SAW
R	P : TEST OUT I : R	P : LEVEL 6/9 I : WHITE R-H SAW	P : LEVEL 6/9 I : WHITE R-V SAW
G	P : TEST OUT I : G	P : LEVEL 6/9 I : WHITE G-H SAW	P : LEVEL 6/9 I : WHITE G-V SAW
B	P : TEST OUT I : B	P : LEVEL 6/9 I : WHITE B-H SAW	P : LEVEL 6/9 I : WHITE B-V SAW
TEST OUT connector			

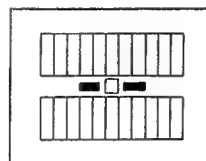
7-9. Gamma Compensation

• Setting

Equipment	Waveform monitor	board	
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• Preparation

Connect a waveform monitor to the TEST OUT connector.
Shoot a gray-scale chart in full underscan's picture frame.



Monitor screen

• Adjustment procedure

Adjustment point: Setting menu

Measurement point: TEST OUT connector

Object: Gray-scale chart

lens IRIS: Adjust the white level as follows:

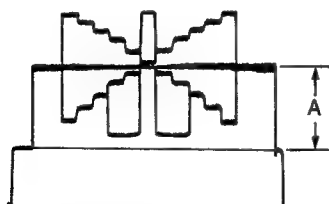
100 \pm 2 IRE (BVW-D600)

700 \pm 10 mV (BVW-D600P)

1. Set the OUTPUT/DCC switch on the side panel to CAM/ON.
2. Set the MENU ON/OFF/PAGE switch at the panel to ON.
3. On the setting menu set PAGE and ITEM as follows in the specified order.

	PAGE	ITEM
①	TEST OUT	G
②	LEVEL 3/9	MASTER GAMMA

4. Set the setting menu to setting ② described above. By pressing the UP/Down button, set level A as follows:
A = 63 \pm 2 IRE (for BVW-D600)
A = 420 \pm 14 mV (for BVW-D600P)

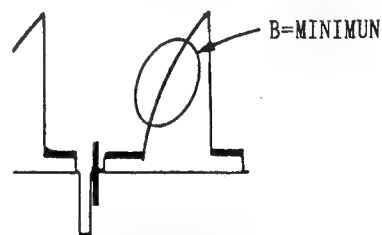


(Waveform monitor)

5. On the setting menu set PAGE and ITEM as follows in the specified order.

	PAGE	ITEM
③	TEST OUT	ENC
④	FUNCTION 1/2	TEST SAW (ON)
⑤	LEVEL 5/9	R GAMMA
⑥	LEVEL 5/9	B GAMMA

6. Under setting ⑤, minimize the carrier leakage at portion B by pressing the UP/DOWN button on the side panel.
7. Under setting ⑥, minimize the carrier leakage at portion B by pressing the UP/DOWN button on the side panel.
8. Repeat steps ⑥ and ⑦ alternately.



(Waveform monitor)

9. On the setting menu, set PAGE and ITEM as follows:
PAGE: TEST OUT
ITEM: ENC
PAGE: FUNCTION 1/2 TEST OUT
ITEM: TEST SAW (OFF)

7-10. BLACK SET adjustment

• Setting

Equipment	Waveform monitor	board	
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• Preparation

Connect a waveform monitor to the TEST OUT connector.

• Adjustment procedure

Adjustment point: Setting menu

Measurement point: TEST OUT connector

lens IRIS: CLOSE

1. Set the OUTPUT/DCC switch on the side panel to CAM/ON.
2. Set the MENU ON/OFF/PAGE switch at the side panel to ON.
3. On the setting menu, set PAGE and ITEM as follows:
PAGE: TEST OUT
ITEM: G
4. On the setting menu, set PAGE and ITEM as follows:
PAGE: LEVEL 3/9
ITEM: MASTER BLACK
5. Adjust level A for the following specification by pressing the UP/DOWN button on the side panel.
A = 10 ± 2 IRE (for BVW-D600)
A = 20 ± 2 mV (for BVW-D600P)
6. On the setting menu, set PAGE and ITEM as follows:
PAGE: TEST OUT
ITEM: ENC
7. Set the MENU ON/OFF/PAGE switch at the side panel to OFF.
8. Set the AUTO W/B BAL switch at the front panel to BLK.



(Waveform monitor)

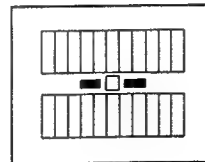
7-11. Flare adjustment

• Setting

Equipment	Vectorscope	board	
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• Preparation

Connect a waveform monitor to the TEST OUT connector.
Shoot a gray-scale chart in full underscan's picture frame .

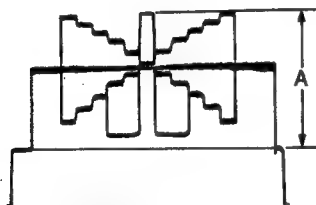


Monitor screen

• Adjustment procedure

Adjustment point: Setting menu
Measurement point: TEST OUT connector
Object: Gray-scale chart
lens IRIS: Adjust the white level as follows:
A = 100 ± 2 IRE (BVW-D600)
A = 700 ± 10 mV (BVW-D600P)

1. Set the OUTPUT/DCC switch on the side panel to CAM/ON.
2. Open the lens iris by one step from the reference setting (corresponding to A).



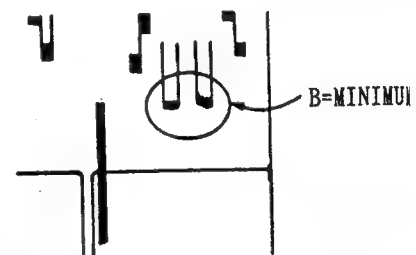
(Waveform monitor)

3. Set the MENU ON/OFF/PAGE switch on the side panel to ON.
4. For the waveform monitor, select 15 lines at the center of the object.

5. On the setting menu set PAGE and ITEM as follows in the specified order.

	PAGE	ITEM
①	LEVEL 5/9	R FLARE
②	LEVEL 5/9	B FLARE

6. Under setting ①, minimize the carrier leakage at portion B by pressing the UP/DOWN button on the side panel.
7. Under setting ②, minimize the carrier leakage at portion B by pressing the UP/DOWN button on the side panel.



(Waveform monitor)

8. Repeat steps 6 and 7 alternately.

7-12. Knee and White Clip adjustment

7-12-1. Manual knee and white clip adjustment

• Setting

Equipment	SC-H Phase measuring instrument	board	
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• Preparation

Connect a waveform monitor to the TEST OUT connector.

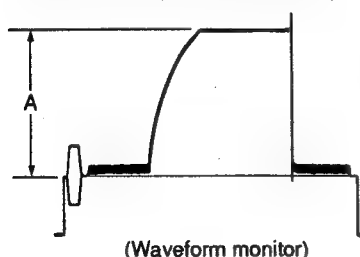
• Adjustment procedure

Adjustment point: Setting menu
Measurement point: TEST OUT connector

- Set the OUTPUT/DCC switch on the side panel to DCQ OFF.
- Set the WHITE BAL switch on the side panel to PRST.
- Set the GAIN switch on the side panel to 9 dB.
- Set the MENU ON/OFF/PAGE switch on the side panel to ON.
- On the setting menu, set PAGE and ITEM as follows in the specified order:

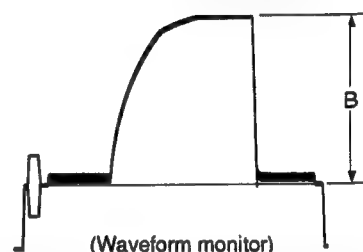
	PAGE	ITEM
①	FUNCTION 1/2	TEST SAW (ON)
②	LEVEL 3/9	WHITE CLIP (OFF)
③		KNEE SLOPE
④		KNEE POINT

- Under setting ③, minimize the level of the knee slope by pressing the UP/DOWN button on the side panel.
- Under setting ④, set the level of the knee point A for the following specification by pressing the UP/DOWN button on the side panel.
 $A = 98 \pm 2$ IRE (for BVW-D600)
 $A = 672 \pm 10$ mV (for BVW-D600P)



- Under setting ②, ③, set the level of the knee slope B for the following specification by pressing the UP/DOWN button on the side panel.

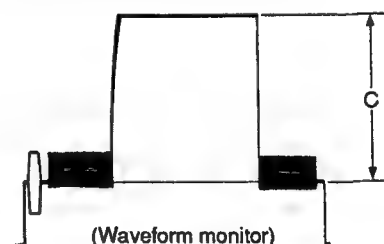
$B = 109 \pm 2$ IRE (for BVW-D600)
 $B = 750 \pm 10$ mV (for BVW-D600P)



- Set the GAIN switch on the side panel to 18 dB.
- On the setting menu, set PAGE and ITEM as follows in the specified order:

	PAGE	ITEM
⑤	LEVEL 3/9	WHITE CLIP (ON)
⑥		WHITE CLIP LEVEL

- Under setting ⑥, set the white clip level C for the following specification by pressing the UP/DOWN button on the side panel.
 $C = 109 \pm 2$ IRE (for BVW-D600)
 $C = 735 \pm 10$ mV (for BVW-D600P)



• Note

The values used in the above adjustment are for the conditions that the white clip level is set to 109 IRE. When the white clip level is set to a value other than 109 IRE, use the following table to set the levels of the knee point and knee slope. *(109 IRE→763 mV: BVW-D600P)

	WHITE CLIP LEVEL (Unit: IRE/mV)			
	109/763	107/749	105/735	103/721
KNEE POINT	98/686	98/686	96/672	96/672
KNEE SLOPE	109/763	107/750	107/750	107/750
WHITE CLIP	109/763	107/750	105/735	103/721

7-12-2. DCC knee adjustment

• Setting

Equipment	Waveform monitor	board	
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• Preparation

Connect a waveform monitor to the TEST OUT connector.

On the setting menu, set PAGE and ITEM as follows:

PAGE: DCC ADJUSTMENT

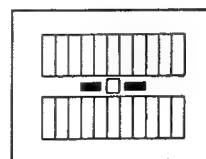
ITEM: KNEE POINT → 0

ITEM: GAIN → 0

Set the OUTPUT/DCC switch on the side panel to DCC.

Shoot a gray-scale chart in full underscan's picture frame by zooming a lens.

Set the WHITE BAL switch at the front of the camera to ON.



Monitor screen

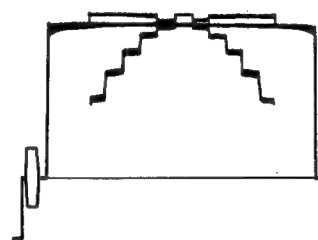
• Adjustment procedure

Adjustment point: Setting menu

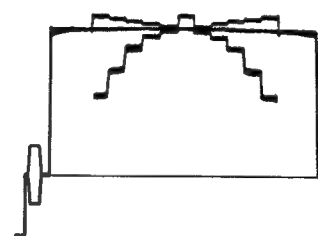
Measurement point: TEST OUT connector

Object: Gray-scale chart

- Adjust the lens iris so that level A is set as follows:
A = 100 ± 2 IRE (BVW-D600)
A = 700 ± 10 mV (BVW-D600P)
- Open the iris from the current setting by 2.5 steps.
- On the setting menu, set PAGE and ITEM as follows:
PAGE: DCC ADJUSTMENT
ITEM: D RANGE
- Set the desired dynamic range by pressing the UP/DOWN button on the side panel.
- On the setting menu, set PAGE and ITEM as follows:
PAGE: DCC ADJUSTMENT
ITEM: POINT
- Set the desired knee characteristics by pressing the UP/DOWN button.
- Enter the extender mode. Shoot the gray-scale chart as large as possible on the underscan monitor using the zoom lens.
- Exit the extender mode.
- On the setting menu, set PAGE and ITEM as follows:
PAGE: DCC ADJUSTMENT
ITEM: GAIN
- Set the desired knee characteristics by pressing the UP/DOWN button on the side panel.



MIN (300 %)



MAX (600 %)

7-13. Detail Signal adjustment

7-13-1. Crispening adjustment

• Setting

Equipment	Waveform monitor	board	
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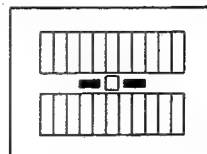
• Preparation

Connect a waveform monitor to the TEST OUT connector.
On the setting menu, set PAGE and ITEM as follows:

PAGE: FUNCTION 1/2

ITEM: DETAIL → ON

Then, set PAGE to LEVEL 1/9 and ITEM to DETAIL LEVEL.
Flip upward the ITEM switch four times to preset the data.
Shoot a gray-scale chart fullunderscan's picture frame by zooming a lens.



Monitor screen

• Adjustment procedure

Adjustment point: Setting menu

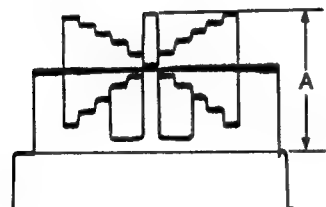
Measurement point: TEST OUT connector

Object: Gray-scale chart

1. Adjust the lens iris so that level A is set as follows:

A = 100 ± 2 IRE (BVW-D600)

A = 700 ± 10 mV (BVW-D600P)



(Waveform monitor)

2. On the setting menu, set PAGE and ITEM as follows:
PAGE: LEVEL 1/9
ITEM: CRISPENING
3. Reduce the noise on the screen to a permissible level by pressing the UP/DOWN button on the side panel.

7-13-2. Level dependent adjustment

• Setting

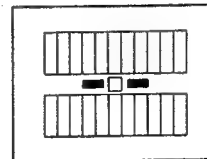
Equipment	Waveform monitor	board	
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• Preparation

Connect a waveform monitor to the TEST OUT connector.
On the setting menu, set PAGE and ITEM as follows:

PAGE: FUNCTION 1/2
ITEM: DETAIL → ON
PAGE: TEST OUT
ITEM: ENC

Set the OUTPUT/DCC switch on the side panel to DCC.
Shoot a gray-scale chart fullunderscan's picture frame by zooming a lens.



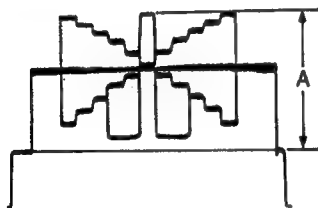
Monitor screen

• Adjustment procedure

Adjustment point: Setting menu
Measurement point: TEST OUT connector
Object: Gray-scale chart

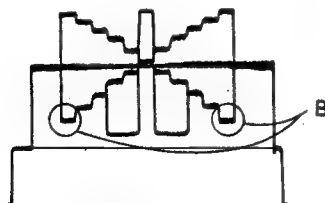
1. Adjust the lens iris so that level A is set as follows:

A = 100 ± 2 IRE (BVW-D600)
A = 700 ± 10 mV (BVW-D600P)



(Waveform monitor)

2. On the setting menu, set PAGE and ITEM as follows:
PAGE: LEVEL 1/9
ITEM: LEVEL DEPEND
3. Eliminate the detail signal from portion B by pressing the UP/DOWN button on the side panel.



(Waveform monitor)

• Note

After this adjustment, be sure to perform 7-13-5, H/V ratio adjustment, and 7-13-6, DTL level adjustment, in that order.

7-13-3. DTL frequency adjustment

• Setting

Equipment	Waveform monitor	board	
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• Preparation

Connect a waveform monitor to the TEST OUT connector.

On the setting menu, set PAGE and ITEM as follows:

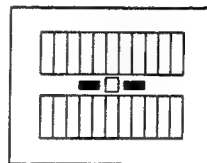
PAGE: FUNCTION 1/2

ITEM: DETAIL → ON

PAGE: TEST OUT

ITEM: ENC

Shoot a gray-scale chart fullunderscan's picture frame by zooming a lens.



Monitor screen

• Adjustment procedure

Adjustment point: Setting menu

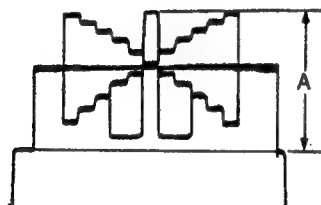
Measurement point: TEST OUT connector

Object: Gray-scale chart

1. Adjust the lens iris so that level A is set as follows:

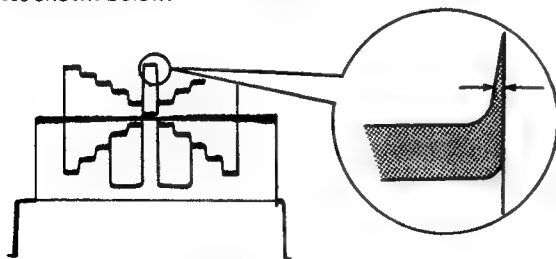
A = 100 ± 2 IRE (BVW-D600)

A = 700 ± 10 mV (BVW-D600P)



(Waveform monitor)

2. Select several lines at the center white portion of the gray-scale chart.
3. On the setting menu, set PAGE and ITEM as follows:
PAGE: LEVEL 1/9
ITEM: H DTL FREQ.
4. Set the desired width of pulse at each edge of the center white portion by pressing the UP/DOWN button, as shown below.



(Waveform monitor)

• Note

After this adjustment, be sure to perform 7-13-5, H/V ratio adjustment, and 7-13-6, DTL level adjustment, in that order.

7-13-4. H/V ratio adjustment

- Setting

Equipment	Waveform monitor	board	
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- Preparation

Connect a waveform monitor to the TEST OUT connector.

On the setting menu, set PAGE and ITEM as follows:

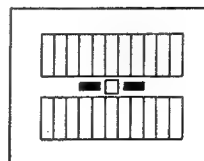
PAGE: FUNCTION 1/2

ITEM: DETAIL → ON

PAGE: TEST OUT

ITEM: ENC

Shoot a gray-scale chart fullunderscan's picture frame by zooming a lens.



Monitor screen

- Adjustment procedure

Adjustment point: Setting menu

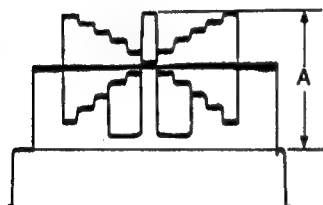
Measurement point: TEST OUT connector

Object: Gray-scale chart

1. Adjust the lens iris so that level A is set as follows:

A = 100 ± 2 IRE (BVW-D600)

A = 700 ± 10 mV (BVW-D600P)



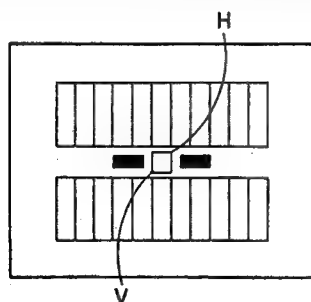
(Waveform monitor)

2. On the setting menu, set PAGE and ITEM as follows:

PAGE: LEVEL 1/9

ITEM: V DTL LEVEL

3. Adjust UP/DOWN button on the side panel so that the H and V detail amounts be added are equivalent.



7-13-5. DTL level adjustment

• Setting

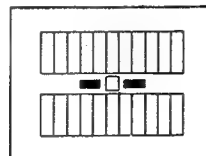
Equipment	Waveform monitor	board	
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• Preparation

Connect a waveform monitor to the TEST OUT connector.
On the setting menu, set PAGE and ITEM as follows:

PAGE: FUNCTION 1/2
ITEM: DETAIL → ON
PAGE: TEST OUT
ITEM: ENC

Shoot a gray-scale chart fullunderscan's picture frame by zooming a lens.

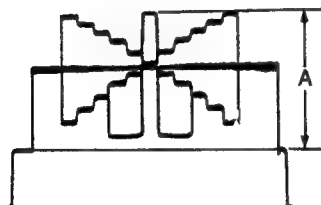


Monitor screen

• Adjustment procedure

Adjustment point: Setting menu
Measurement point: TEST OUT connector
Object: Gray-scale chart

- Adjust the lens iris so that level A is set as follows:
A = 80 ± 2 IRE (BVW-D600)
A = 560 ± 10 mV (BVW-D600P)



(Waveform monitor)

- On the setting menu, set PAGE and ITEM as follows:
PAGE: LEVEL 1/9
ITEM: DETAIL LEVEL
- Set the desired level of the detail signal added to each step in the gray-scale chart by pressing the UP/DOWN button on the side panel.

7-13-6. Knee aperture adjustment

• Setting

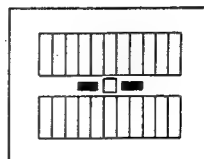
Equipment	Waveform monitor	board	
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• Preparation

Connect a waveform monitor to the TEST OUT connector.
On the setting menu, set PAGE and ITEM as follows:

PAGE: FUNCTION 1/2
ITEM: DETAIL → ON
PAGE: TEST OUT
ITEM: ENC

Set the OUTPUT/DCC switch on the side panel to DCC .
Shoot a gray-scale chart fullunderscan's picture frame by zooming a lens.

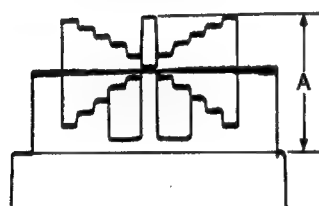


Monitor screen

• Adjustment procedure

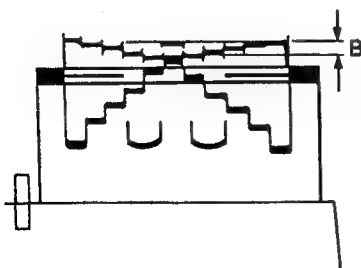
Adjustment point: Setting menu
Measurement point: TEST OUT connector
Object: Gray-scale chart

1. Adjust the lens iris so that level A is set as follows:
A = 100 ± 2 IRE (BVW-D600)
A = 700 ± 10 mV (BVW-D600P)



(Waveform monitor)

2. Set the GAIN switch at the side panel to 9 dB.
3. On the setting menu, set PAGE and ITEM as follows:
PAGE: LEVEL 1/9
ITEM: KNEE APERTURE
4. Adjust the peak-to-peak level of the noise at the third step from the top (portion B) in the gray-scale chart, as desired, by pressing the UP/DOWN button on the side panel.



(Waveform monitor)

7-13-7. HDTL clip adjustment

• Setting

Equipment	Waveform monitor	board	
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• Preparation

Connect a waveform monitor to the TEST OUT connector.

On the setting menu, set PAGE and ITEM as follows:

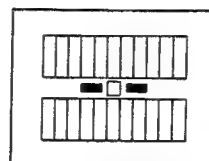
PAGE: FUNCTION 1/2

ITEM: DETAIL → ON

PAGE: TEST OUT

ITEM: ENC

Shoot a gray-scale chart fullunderscan's picture frame by zooming a lens.



Monitor screen

• Adjustment procedure

Adjustment point: Setting menu

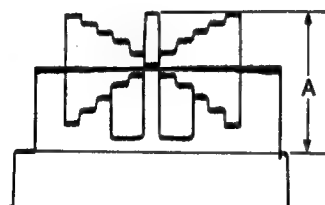
Measurement point: TEST OUT connector

Object: Gray-scale chart

1. Adjust the lens iris so that level A is set as follows:

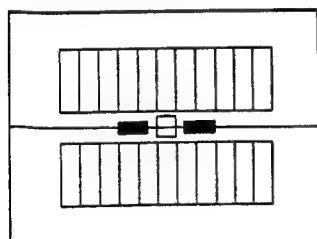
$A = 100 \pm 2$ IRE (BVW-D600)

$A = 700 \pm 10$ mV (BVW-D600P)



(Waveform monitor)

2. Set the waveform monitor function to Line Select.
3. Select the line at the center of the center white portion in the gray-scale chart.



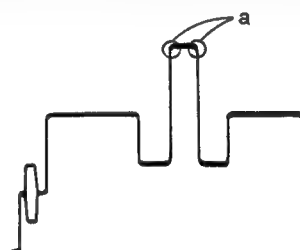
Line Select

4. On the setting menu, set PAGE and ITEM as follows:

PAGE: LEVEL 1/9

ITEM: DTL WHT CLIP

5. Set the edges of portion a to the desired clip level by pressing the UP/DOWN button on the side panel.



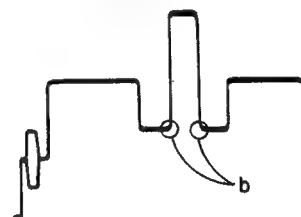
(Waveform monitor)

6. On the setting menu, set PAGE and ITEM as follows:

PAGE: LEVEL 1/9

ITEM: DTL BLK CLIP

7. Set the edges of portion b to the desired clip level by pressing the UP/DOWN button on the side panel.



(Waveform monitor)

7-13-8. V DTL clip adjustment

• Setting

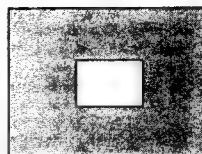
Equipment	Waveform monitor	board	
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• Preparation

Connect a waveform monitor to the TEST OUT connector.
On the setting menu, set PAGE and ITEM as follows:

PAGE: FUNCTION 1/2
ITEM: DETAIL → ON
PAGE: TEST OUT
ITEM: ENC

Shoot a White window chart full underscan's picture frame
by zooming a lens.

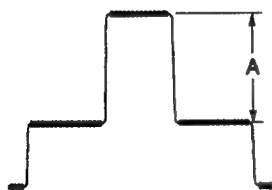


Monitor screen

• Adjustment procedure

Adjustment point: Setting menu
Measurement point: TEST OUT connector
Object: White window chart

- Adjust the lens iris so that level A is set as follows:
A = 100 ± 2 IRE (BVW-D600)
A = 700 ± 10 mV (BVW-D600P)



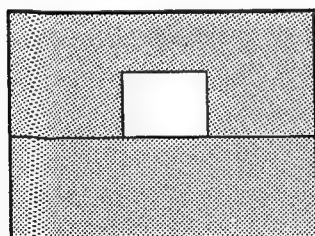
(Waveform monitor)

- On the setting menu, set PAGE and ITEM as follows:
PAGE: LEVEL 1/9
ITEM: V DTL BLK CLIP
- Set the negative V edge (portion a) to the desired clip level by pressing the UP/DOWN button on the side panel.



(Waveform monitor)

- Set the waveform monitor function to Line Select.
- Select the line at the bottom of the center white portion in the gray-scale chart.



Line Select

7-14. Zebra adjustment

• Setting

Equipment	Waveform monitor	board	
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• Preparation

Set the ZEBRA switch, displayed on the viewfinder, to ZEBRA.

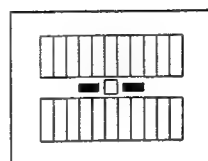
On the setting menu, set PAGE to TEST OUT and ITEM to ENC.

Shoot a gray-scale chart full underscan's picture frame by zooming a lens.

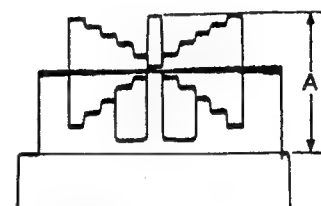
Adjust the lens iris so that level A is set as follows:

A = 100 ± 2 IRE (BVW-D600)

A = 700 ± 10 mV (BVW-D600P)



(Monitor screen)



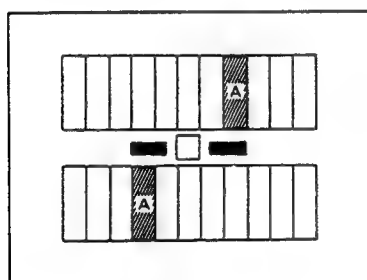
(Waveform monitor)

• Adjustment procedure

- Adjustment point: Setting menu
PAGE: LEVEL 3/9
ITEM: ZEBRA 1 DETECT

Measurement point: Viewfinder

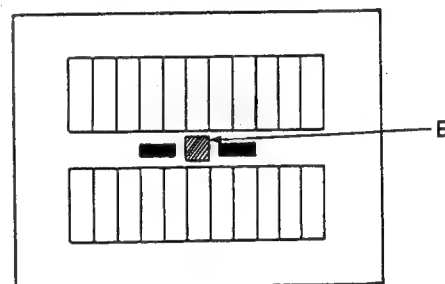
Specification: Set the condition that stripes appear at the center of portions A on the viewfinder screen, by pressing the UP/DOWN button on the side panel.



(Viewfinder screen)

- On the setting menu, set PAGE to LEVEL 3/9 and ITEM to ZEBRA 2 DETECT.

Specification: Set the condition that stripes appear at the center of portion B on the viewfinder screen, by pressing the UP/DOWN button on the side panel.



(Viewfinder screen)

- On the setting menu, set PAGE to LEVEL 3/9 and ITEM to ZEBRA2 → ON.

- Set the ZEBRA switch, displayed on the viewfinder, to ZEBRA/OFF.

7-15. Automatic Iris adjustment

• Setting

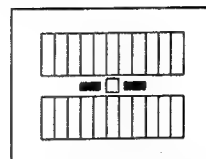
Equipment	Waveform monitor	board	
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• Preparation

Set the OUTPUT/DCC switch on the side panel to CAM/ON.
On the setting menu, set PAGE to TEST OUT and ITEM to ENC.

Set the lens AUTO/MANU switch to AUTO.

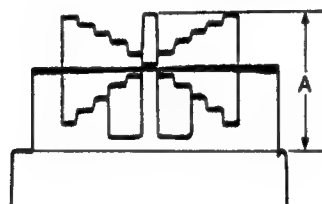
Shoot a gray-scale chart full underscan's picture frame by zooming a lens.



(Monitor screen)

• Adjustment procedure

- Adjustment point: Setting menu
PAGE: LEVEL 9/9
ITEM: IRIS SET
Specification: Adjust the lens iris so that level A is set as follows:
A = 100 ± 2 IRE (BVW-D600)
A = 700 ± 10 mV (BVW-D600P)



- Adjustment point: Setting menu
PAGE: LEVEL 9/9
ITEM: IRIS MODE
Measurement point: TEST OUT connector
Specification: Set the automatic iris operation mode depending on the application. Press the UP button to set the mode to that in which the iris operates according to the average level of the video signal. Press the DOWN button to set the mode to that in which the iris operates according to the peak-to-peak level of the video signal.
- Set the lens AUTO/MANU switch to MANU.
- Set the OUTPUT/DCC switch on the side panel to CAM/OFF.

7-16. Audio Level adjustment

• Setting

Equipment	Oscilloscope	board	
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• Preparation

Set the AUDIO IND switch, displayed on the viewfinder, to ON.

Apply a 1-kHz sine wave signal with an amplitude of 0 dBu to the AUDIO IN CH-1 connector.

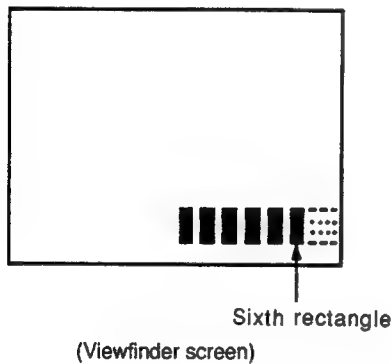
Set the external AUDIO SELECT CH-1 switch to MAN.

Set the external AUDIO IN switch to LINE.

Remove the AT-75 board. Insert an extension board, then the AT-75 board.

• Adjustment procedure

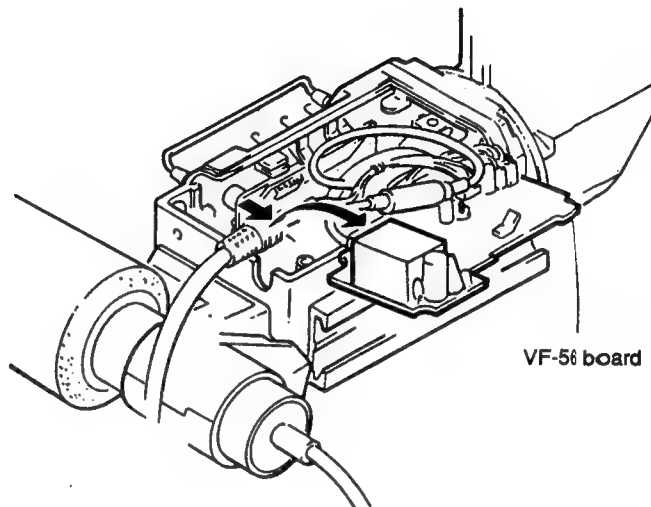
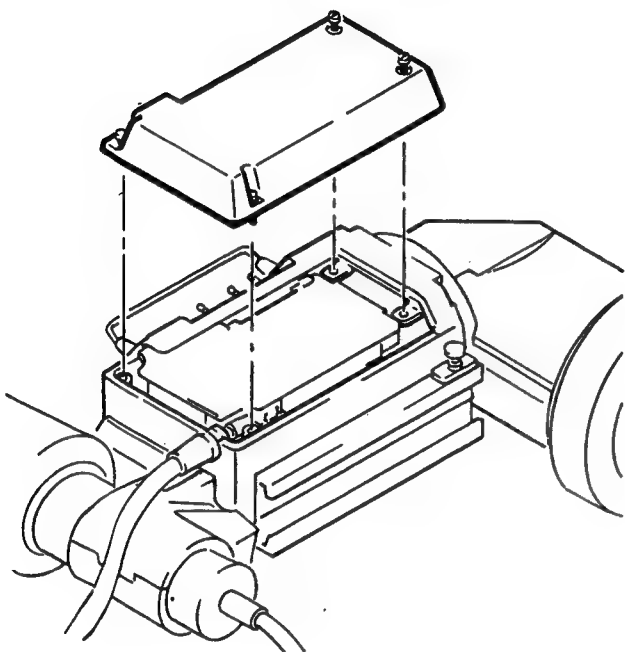
1. Adjustment point: External control for AUDIO LEVEL CH-1
Measurement point: TP32 on the extension board
Standard: 0.7 Vp-p
2. Adjustment point: Viewfinder
Measurement point: ●RV1 (AUDIO) on the AT-75 board
Specification: Adjust ●RV1 so that the sixth rectangle is displayed on the viewfinder screen.



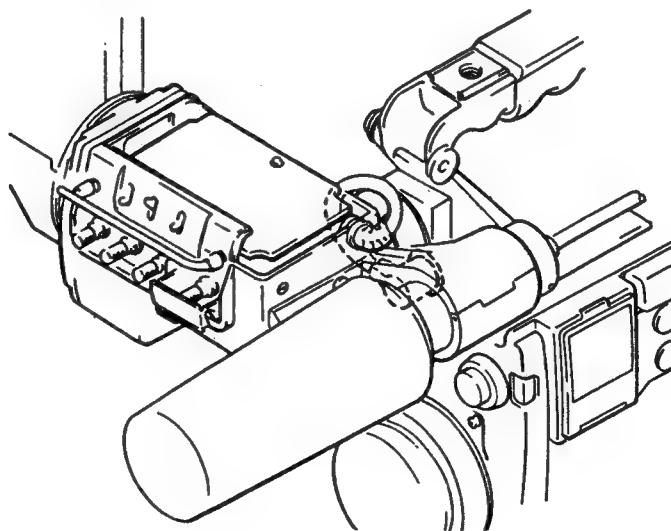
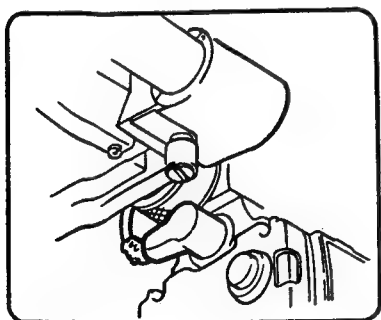
7-17. VIEWFINDER SYSTEM ADJUSTMENT

This adjustment should be performed after the camera is adjusted completely.

1. Turn OFF the main POWER switch (side panel) before adjustment.
2. Remove the viewfinder from the camera, then remove the viewfinder cover.
4. As illustrated below, open the VF-56 board while moving it in the direction of the arrows and open the board so that the component side is placed to the upper position.



3. Turn the viewfinder upside down and install it.
5. Set the main POWER switch to ON.



7-17-1. Vertical Hold Adjustment

• Setting

Equipment	Dualtrace Oscilloscope	board	VF-56 board
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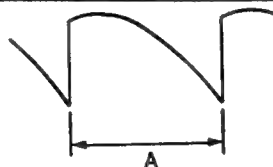
• Preparation

Extract the IF-393/393P board from the unit.

●RV6 (V SIZE)/VF-56 mechanical center (When ●RV6 is marked, it should not be turned.)

• Adjustment procedure

Test point: TP3/VF-56
GND E1/VF-56
Adj. point: ●RV5 (V HOLD)/VF-56
Spec.: $A=20.4 \pm 0.5$ ms



• Note

• After adjustment is completed, install the IF-393/393P board to the unit.

7-7-2. Horizontal Hold Adjustment

• Setting

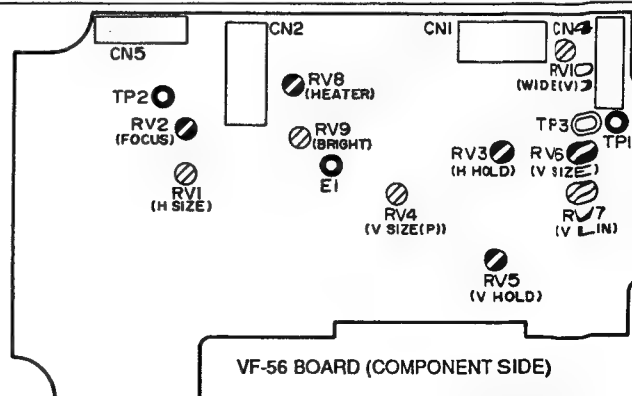
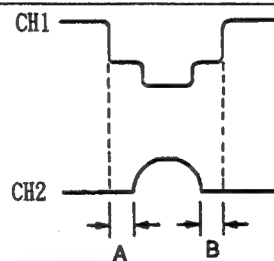
Equipment	Dualtrace Oscilloscope	board	VF-56 board
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• Preparation

Shoot the 100% white picture frame and set the white level to 100 ± 2 IRE.

• Adjustment procedure

Test point: CH-1. TP2/VF-56
GND E1
CH-2. TP1/VF-56
GND E1
Adj. point: ●RV3 (H HOLD)/VF-56
Spec.: $A=B$





7-17-3. Bright Set Adjustment

- Setting



Equipment		board	VF-56 board
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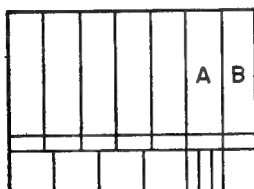
- Preparation

OUTPUT/DCC switch (side panel): BARS/OFF.
 BRIGHT control (viewfinder): Fully turn counterclockwise. 
 CONTRAST control (viewfinder): Fully turn clockwise. 



- Adjustment procedure

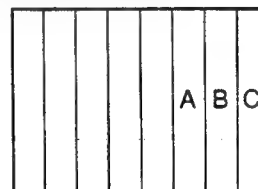
For BVW-D600

Test point: Viewfinder
 Adj. point: RV9 (SUB BRIGHT)/VF-56
 Spec.: Adjust RV9/VF-56 so that portions A and B on the viewfinder screen can be barely discriminated.



For BVW-D600P

Test point: Viewfinder
 Adj. point: RV9 (SUB BRIGHT)/VF-56
 Spec.: Adjust RV9/VF-56 so that portions A and B on the viewfinder screen can be barely discriminated, and portions B and C cannot be discriminated.



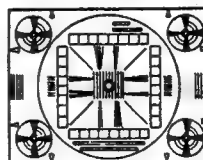
7-17-4. Focus Adjustment

- Setting

Equipment		board	VF-56 board
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- Preparation

Shoot the resolution chart in a full picture frame.
 Adjust the iris control so that the output level at the VIDEO OUT terminal is 100 ± 2 IRE.
 Adjust so that the LENS FOCUS is set to the best focusing point on the black and white monitor.
 Bright and CONTRAST controls of the viewfinder:
 mechanical center.



(Viewfinder screen)

- Adjustment procedure

Test point: Viewfinder
 Adj. point: RV2 (FOCUS)/VF-56
 Spec.: Gradually turn RV2 (FOCUS) on the VF-56 board from fully counterclockwise to clockwise so that the focus is best.
 (RV should be turned slowly.)

- Note

After adjustment is completed, check that the focus operation can be performed irrespective of its BRIGHT and CONTRAST controls setting.

7-17-5. Picture Frame Adjustment

• Setting

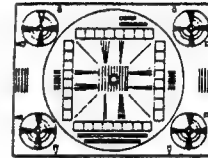
Equipment		board	VF-56 board
-----------	--	-------	-------------

• Note

7-17-4. Focus adjustment and this adjustment affect each other. Repeat these adjustment until both specifications are met.

• Preparation

BRIGHT control (viewfinder): mechanical center.
 CONTRAST control (viewfinder): mechanical center.
 PEAKING control (viewfinder): mechanical center.
 Shoot the resolution chart in a full under scan's picture frame by zooming a lens.



Monitor screen

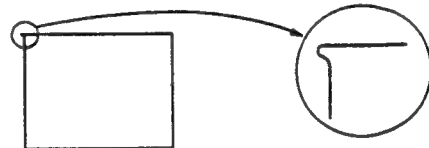
• Adjustment procedure

Step 1.

Test point: Viewfinder

Adj. point: ●RV3 (H HOLD)/VF-56

Spec.: If the upper left corner of the picture is distorted, make right angle.



Step 2.

Test point: Viewfinder

Adj. point: ●RV7 (V LIN)/VF-56

Spec.: Minimize the distortion of the four circles at the four corners of the resolution chart.

Step 3.

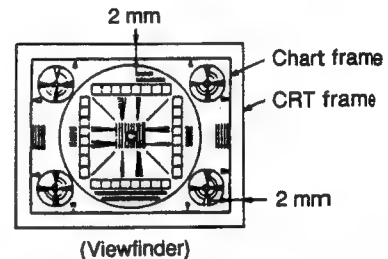
Test point: Viewfinder

Adj. point: ●RV1 (H SIZE)/VF-56

●RV6 (V SIZE)/VF-56

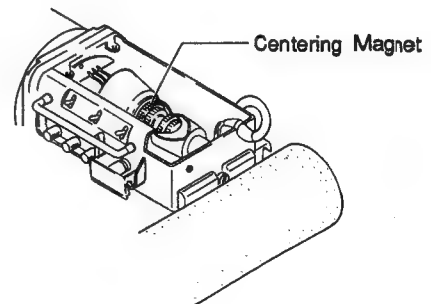
●Centering magnet

Spec.: Adjust ●RV1 (H SIZE) and ●RV6 (V SIZE) so that the resolution chart is as shown below. Turn the centering magnet only when the left and upper corners cannot be adjusted.



Step 4.

After the adjustment, return the boards to their original positions and assemble the viewfinder. The make sure that the image is at the center of VF screen when observing the VF screen.



• Note

When the paint-locked centering magnet is turned, paint-lock it again.

7-17-6. HEATER voltage adjustmemt

• Setting

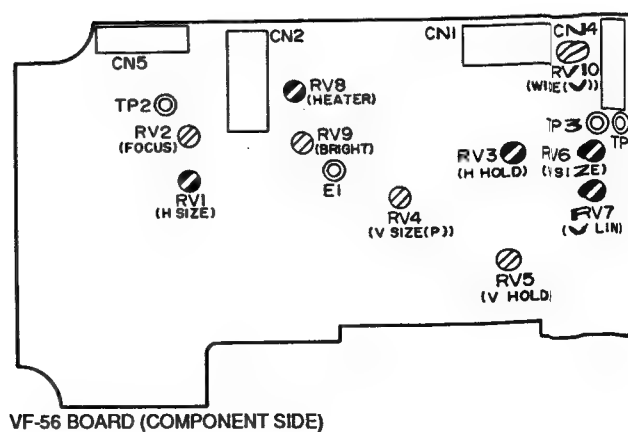
Equipment	Digital voltmeter	board	VF-56 board
-----------	-------------------	-------	-------------

• Preparation

Extract the IF-393/393P board from the unit.
 BRIGHT control (viewfinder): mechanical center.
 CONTRAST control (viewfinder): mechanical center.

• Adjustment procedure

Test point: CN5-3 pin/VF-56
 CN5-4 pin/VF-56
 Adj. point: ●RV8 (HEATER)/VF-56
 Spec.: 700 ±10 mV



SECTION 8

VTR SYSTEM ALIGNMENT

8-1. PRECAUTIONS ON ADJUSTMENTS

- **Boards Extension**

When the boards are extended, be sure to turn the POWER switch to OFF position.

8-2. POWER AND SYSTEM CONTROL ADJUSTMENT

[Equipment]

- Variable DC Power Supply
- Digital Voltmeter
- Blank tape BCT-20G or BCT-20M

[Switches setting on the side panel and function Panel]

Do not change the setting below unless otherwise specified.

- | | |
|---------------------------------|-------------|
| • VTR switch | : STBY |
| • GAIN selector | : 0 |
| • OUTPUT/DCC selector | : CAM/OFF |
| • WHITE BAL selector | : PRST |
| • AUDIO IN CH-1/CH-2 switch | : REAR/LINE |
| • AUDIO SELECT CH-1/CH-2 switch | : AUTO |
| • F-RUN/R-RUN switch | : R-RUN |
| • REAL TIME switch | : OFF |

8-2-1. BATT +5V Voltage Adjustment

- Setting

Equipment: Digital Volt Meter	Board: PS-162B board
-------------------------------	----------------------

- Preparation

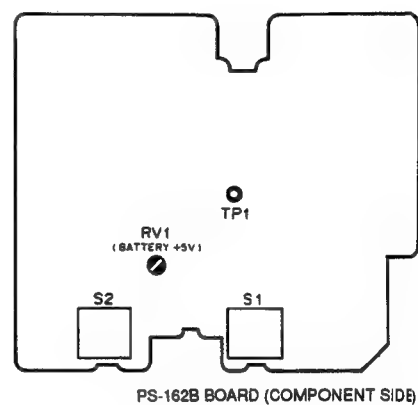
- DC IN: 12V \pm 0.5Vdc
- Insert a cassette tape and put the unit into the REC mode.

- Adjustment procedures

Test point : TP1;PS-162B (GND : E1;PS-162B)

Adj. point :  RV1 (BATTERY +5 V);PS-162B

Spec. : +5.5 \pm 0.02 Vdc



8-2-2. Battery Voltage Detection Adjustment

• Setting

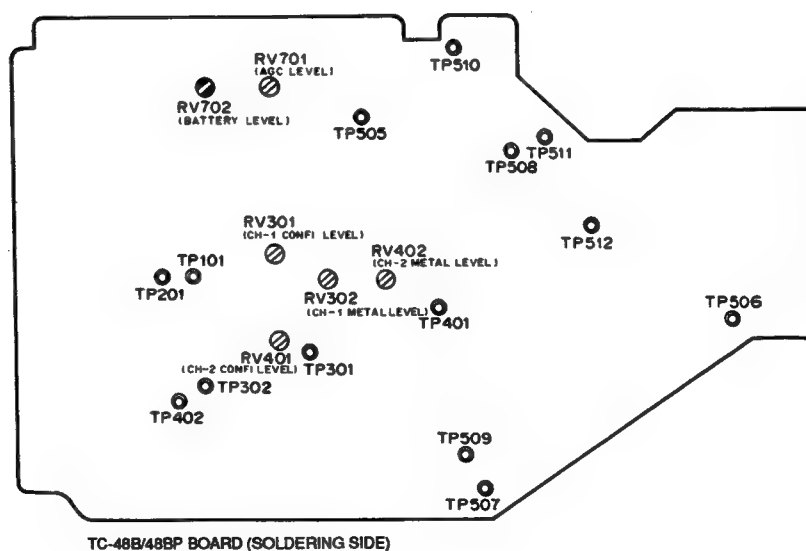
Equipment: Digital Volt Meter	Board: TC-48B/48BP board
-------------------------------	--------------------------

• Preparation

- DC IN: 11.50 ± 0.02 Vdc
- Insert a cassette tape and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP505; TC-48B/48BP
GND: E501; TC-48B/48BP
- Adj. Point : RV702
(BATTERY LEVEL); TC-48B/48BP
- Spec. : 1.95 ± 0.03 Vdc



8-3. SERVO SYSTEM ADJUSTMENT

[Equipment]

- Dual Trace Oscilloscope
- Blank tape BCT-20G or BCT-20M

[Switches setting on the side panel and function panel]

Do not change the setting below unless otherwise specified.

- | | |
|---------------------------------|-------------|
| • VTR switch | : STBY |
| • GAIN selector | : 0 |
| • OUTPUT/DCC selector | : CAM/OFF |
| • WHITE BAL selector | : PRST |
| • AUDIO IN CH-1/CH-2 switch | : REAR/LINE |
| • AUDIO SELECT CH-1/CH-2 switch | : AUTO |
| • F-RUN/R-RUN switch | : R-RUN |
| • REAL TIME switch | : OFF |

8-3-1. Capstan FG-B Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

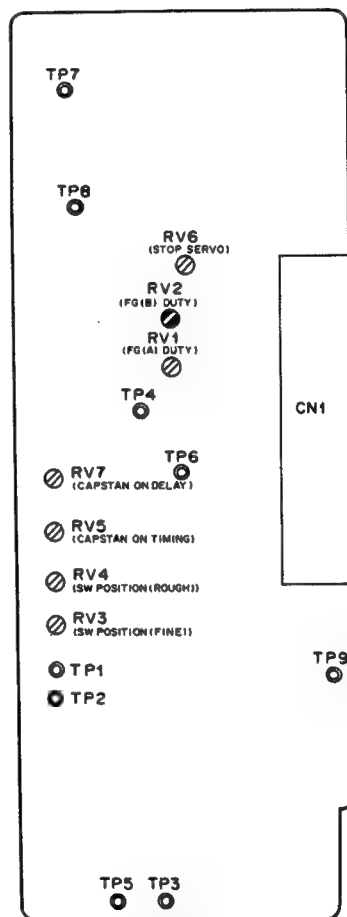
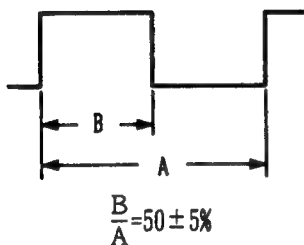
Board: SV-97A/97AP board

• Preparation

• Insert the BCT-20M or BCT-20G and put the unit into the PLAY mode.

• Adjustment procedures

- Test point : TP27;Extension board
- Adj. point : RV2 (FG(B) DUTY);SV-97A/97AP
- Spec. : $\frac{B}{A} = 50 \pm 5\%$



SV-97A/97AP BOARD (COMPONENT SIDE)

8-3-2. Stop Servo Adjustment

• Setting

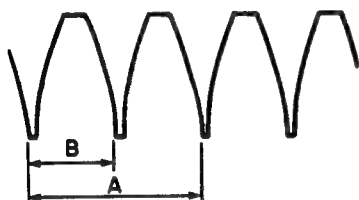
Equipment: Dual Trace Oscilloscope	Board: SV-97A/97AP board
------------------------------------	--------------------------

• Preparation

- Insert the BCT-20M or BCT-20G.
- When carrying adjustment procedure 1, put the unit into the PLAY mode.
- When carrying adjustment procedure 2, put the unit into the STOP mode.

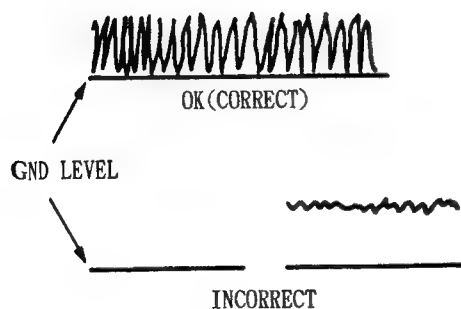
• Adjustment procedures

- 1 Test point : TP4;SV-97A/97AP
 Adj. point : RV1 (FG(A) DUTY);SV-97A/97AP
 Spec. : $\frac{B}{A} = 50 \pm 5\%$ (PLAY mode)

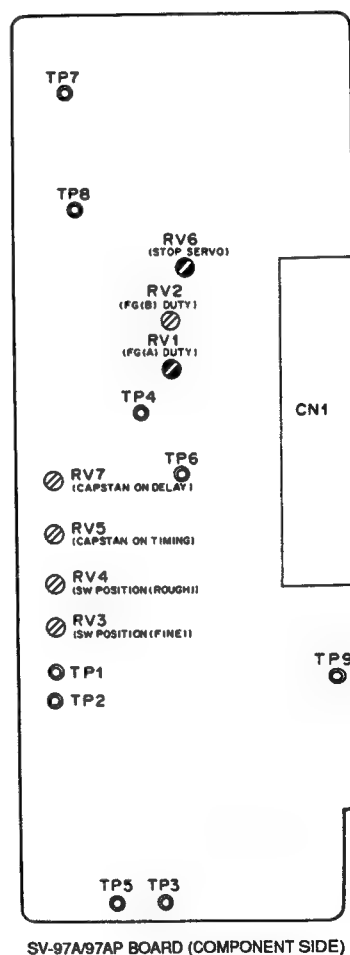


TRIG: TP27/Extension board

- 2 Test point : TP4;SV-97A/97AP
 Adj. point : RV6;SV-97A/97AP



TRIG: TP27/Extension board



SV-97A/97AP BOARD (COMPONENT SIDE)

8-3-3. Composite Shooting Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

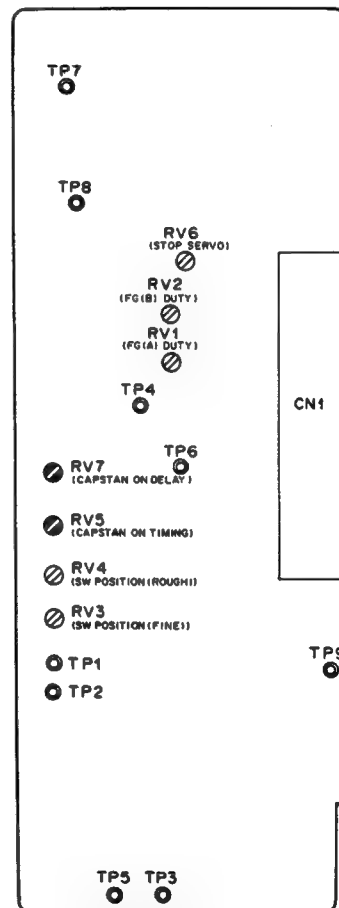
Board: SV-97A/97AP board

• Preparation

- Insert the BCT-20M or BCT-20G.
- Connect the Servo Remote Control Tool to connector CN2 on the SV-97A/97AP board.
- Short between TP11 and TP1 on the extension board with a shorting clip.
- Short between TP9 on the SV-97A/97AP board and TP18 on the extension board with a shorting clip.

• Adjustment procedures

- 1 • REC SERVO switch/Servo Remote Control Tool : ON
 - Test point : TP7;Extension board
 - Spec. : Check that the signal at TP7 is set low, high, and low (for 80 seconds (max)).
- 2 • REC SERVO switch/Servo Remote Control Tool : OFF
 - Test point : TP8;Extension board
 - Adj. point : ●RV5 (CAPSTAN ON TIMING);SV-97A
 - Spec. : Adjust so that the high signal at TP8 is set low.
- 3 • Test point : TP10;Extension board
 - Adj. point : ●RV7 (CAPSTAN ON DELAY);SV-97A
 - Spec. : Adjust so that the high signal at TP10 is set low.
4. Remove the shorting clips and set the connector to the former position.
5. Connect a variable DC power supply to DC IN connector, and set the voltage to $12.0\text{ V} \pm 0.1\text{ V}$.
 - Test point : Tap (center pin) of RV5
 - Adj. point : ●RV5;SV-97A/97AP
 - Spec. : Measure the voltage at the tap (center pin) of RV5, and adjust to the voltage that is the measured voltage $+0.8\text{ V}$.



SV-97A/97AP BOARD (COMPONENT SIDE)

8-4. AUDIO SYSTEM ADJUSTMENT

[Equipment]

- Low-frequency Oscillator
- Audio Noise Meter
- DC Voltmeter
- Frequency Counter
- Modulation Analyzer
- PB Adaptor: VA-500 (For NTSC), VA-500P (For PAL)
- Standard VTR player : BVW-75/75P or the equivalent
- Blank tape BCT-20G or BCT-20M
- Alignment tape

For NTSC : CR8-1A (8-960-097-45): OXIDE

For PAL : CR8-1APS (8-960-098-45): OXIDE

TIME min. sec	AUDIO
0:00	1kHz/0VU
2:55	Blank
3:00	10kHz/-10VU
4:55	Blank
5:00	1kHz/-20VU
5:55	Blank
6:00	40Hz/-20VU
6:25	Blank
6:30	7kHz/-20VU
6:55	Blank
7:00	10kHz/-20VU
7:25	Blank
7:30	15kHz/-20VU
7:55	Blank
8:00	1kHz sine wave (for audio & CTL height)
10:00	

[Switches setting on the side panel]

Do not change the setting below unless otherwise specified.

- AUDIO SELECT CH-1/CH-2 switch : AUTO
- MONITOR switch : PB
- MONITOR SELECT switch : MIX
- AUDIO IN switch : LINE
- DOLBY NR switch : OFF

[Note]

- 0dBu=0.775Vrms
- Put the Audio Noise Meter into rms mode.
- "WEIGHTING" in the specifications column shows WEIGHTING mode of the audio Noise Meter.
DIN AUDIO: 22Hz to 22kHz BPF

8-4-1. Level Volume Reference Position Adjustment

• Setting

Equipment: Audio Noise Meter	Board: TC-48B/48BP board
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• Preparation

- AUDIO SELECT CH-1/CH-2 SW→MAN
- AUDIO IN CH-1/CH-2 connector: 1kHz, + 4dBu
- EJECT mode

• Adjustment procedures

- Test point : CH-1 : TP101;TC-48B/48BP
CH-2 : TP201;TC-48B/48BP
- Adj. point : CH-1 : ●RV101 (CH-1 AUDIO LEVEL);TC-48B/48BP (side panel)
CH-2 : ●RV201 (CH-2 AUDIO LEVEL);TC-48B/48BP (side panel)
- Spec. : $-10.0 \pm 0.1 \text{dBu}$
WEIGHTING: DIN AUDIO

TC-48B/48BP BOARD (COMPONENT SIDE)

TC-48B/48BP BOARD (PANEL SIDE)

• Note

The adjustment level in this section is used as an audio system's reference level.
After that, never turn RV101 and RV201 during audio system adjustment.

8-4-2. Level Meter Adjustment

• Setting

Equipment: DC Voltmeter	Board: TC-48B/48BP board
-------------------------	--------------------------

• Preparation

<ul style="list-style-type: none"> AUDIO SELECT CH-1/CH-2 SW→MAN AUDIO IN CH-1/CH-2 connector: 1kHz, +4dBu
--

• Adjustment procedures

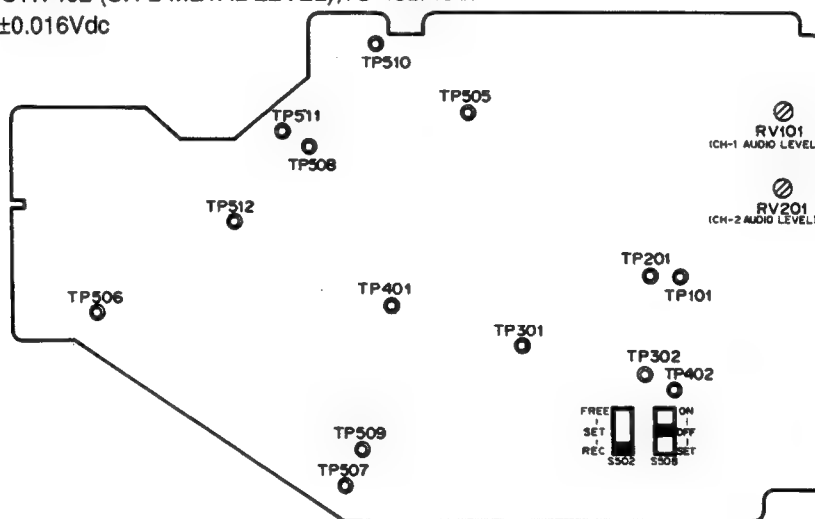
Test point : CH-1 : TP301;TC-48B/48BP

CH-2 : TP401;TC-48B/48BP

Adj. point : CH-1 : RV302 (CH-1 METAL LEVEL);TC-48B/48BP

CH-2 : RV402 (CH-2 METAL LEVEL);TC-48B/48BP

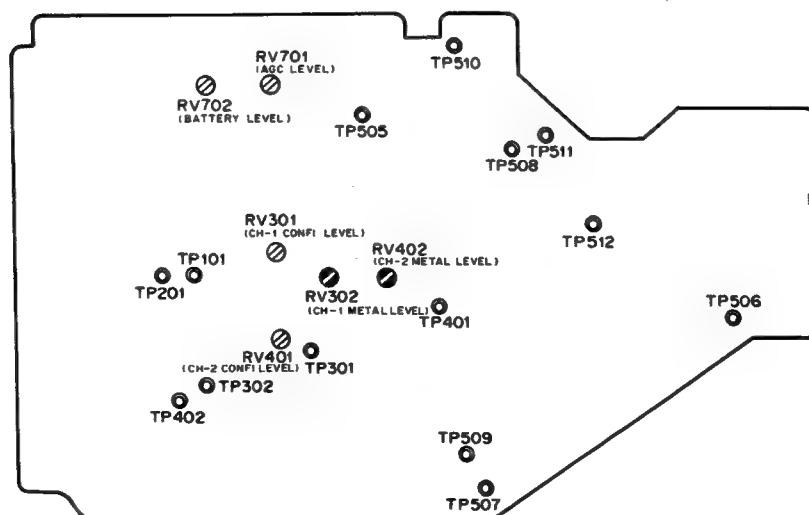
Spec. : $+1.104 \pm 0.016 \text{Vdc}$



TC-48B/48BP BOARD (COMPONENT SIDE)



TC-48B/48BP BOARD (PANEL SIDE)



TC-48B/48BP BOARD (SOLDERING SIDE)

8-4-3. CONFI Level Adjustment

• Setting

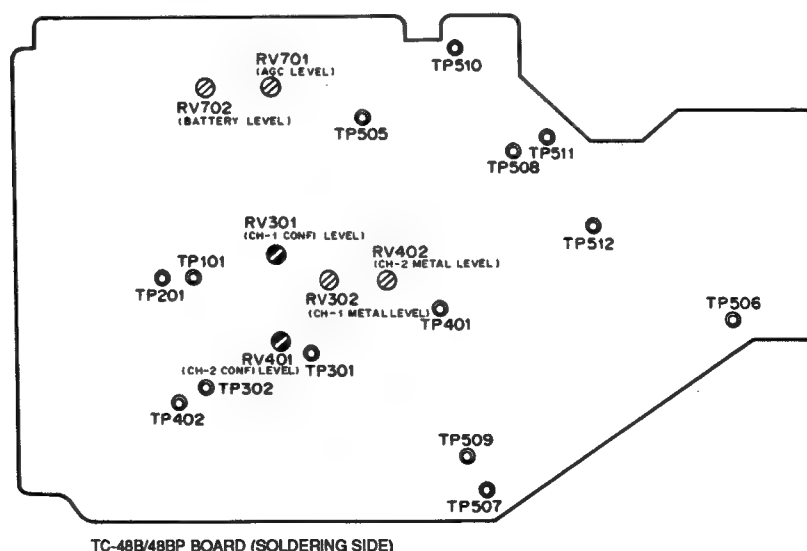
Equipment: Audio Noise Meter	Board: TC-48B/48BP board
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• Preparation

- AUDIO IN CH-1/CH-2 connector: 1kHz, +4dBu
- MONITOR SELECT SW → CH-1
- MONITOR control (side panel): Fully turn clockwise
- Insert the following alignment tape and put the unit into the STOP mode.
For NTSC : CR8-1A
For PAL : CR8-1APS

• Adjustment procedures

- Test point : EARPHONE connector (8-ohm load)
 - Adj. point : ① ●RV301 (CH-1 CONFI LEVEL);TC-48B/48BP
② ●RV401 (CH-2 CONFI LEVEL);TC-48B/48BP
 - Spec. : ① (Calibrated value in adjustment procedure1) $\pm 0.1\text{dB}$
② (Calibrated value in adjustment procedure1) $\pm 0.1\text{dB}$
1. Take a note of the level at the EARPHONE Connector (8-ohm load)
 2. Play back the audio 1KHz/0dB portion of the following alignment tape.
For NTSC : CR8-1A
For PAL : CR8-1APS
 3. Adjust ●RV301 (CH-1 CONFI LEVEL);TC-48B/48BP to $\pm 0.1\text{dB}$ of the value calibrated in procedure 1.
 4. Set the MONITOR SELECT SW to CH-2.
 5. Play back the audio 1KHz/0dB portion of the following alignment tape.
For NTSC : CR8-1A
For PAL : CR8-1APS
 6. Adjust ●RV401 (CH-2 CONFI LEVEL);TC-48B/48BP to $\pm 0.1\text{dB}$ of the value calibrated in procedure 1.



• Note

- After r having been adjusted, the monitor switch should be put into MIX.

8-4-4. CONF TC Cancel Adjustment

- Setting

Equipment: Audio Noise Meter	Board: TB-5 board
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- Preparation

<ul style="list-style-type: none">• AUDIO IN CH-1/CH-2 connector: No signal• MONITOR control (side panel): Fully turn clockwise• Insert the BCT-20M and put the unit into the REC mode.

- Adjustment procedures

<ul style="list-style-type: none">• Test point : EARPHONE connector (8-ohm load)• Adj. point : CH-1: ♂RV1;TB-5, ♂RV2;TB-5 CH-2: ♂RV11;TB-5, ♂RV12;TB-5• Spec. : Minimize the level. WEIGHTING: CCIR ARM

TB-5 BOARD (COMPONENT SIDE)

8-4-5. Dolby Input Level Adjustment

• Setting

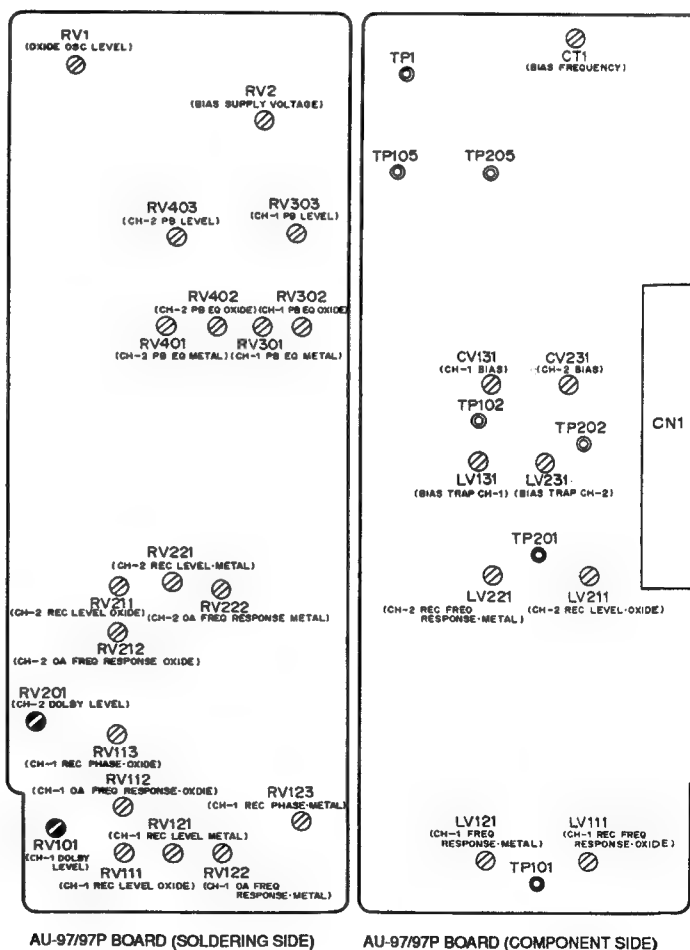
Equipment: Audio Noise Meter	Board: AU-97/97P board
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• Preparation

- AUDIO IN CH-1/CH-2 connector: 1kHz, +4dBu

• Adjustment procedures

- Test point : CH-1 : TP101;AU-97/97P
CH-2 : TP201;AU-97/97P
- Adj. point : ●RV101 (CH-1 DOLBY LEVEL);AU-97/97P
●RV201 (CH-2 DOLBY LEVEL);AU-97/97P
- Spec. : $-10.0 \pm 0.1 \text{ dBu}$
WEIGHTING: DIN AUDIO



8-4-6. Bias Supply Voltage Adjustment

• Setting

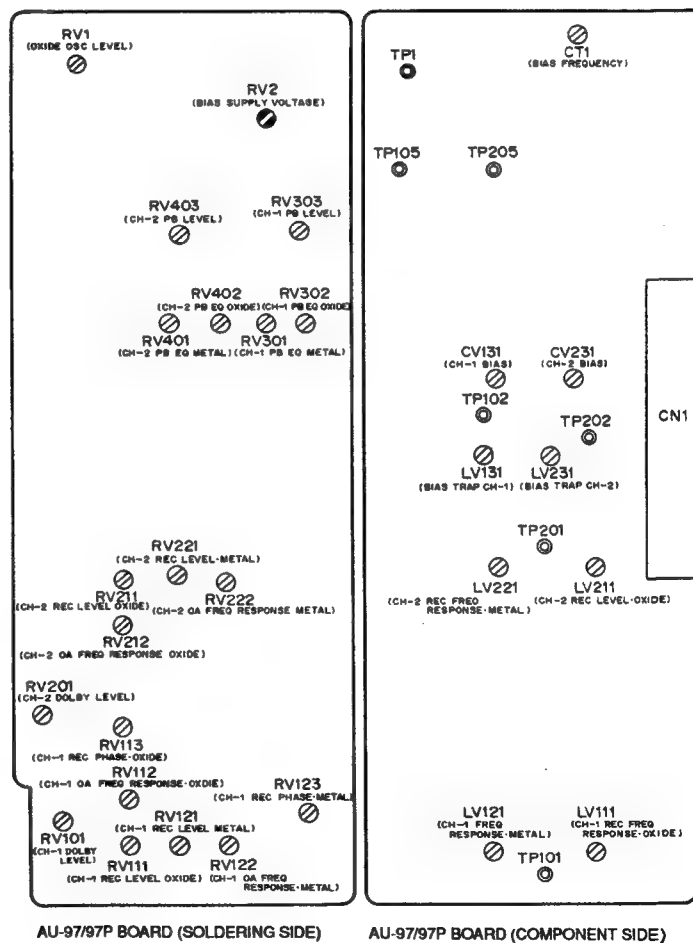
Equipment: DC Voltmeter	Board: AU-97/97P board
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• Preparation

- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP1;AU-97/97P
- Adj. point : ●RV2 (BIAS SUPPLY VOLTAGE);AU-97/97P
- Spec. : $+10.00 \pm 0.01 \text{Vdc}$



8-4-7. Bias Trap Adjustment

• Setting

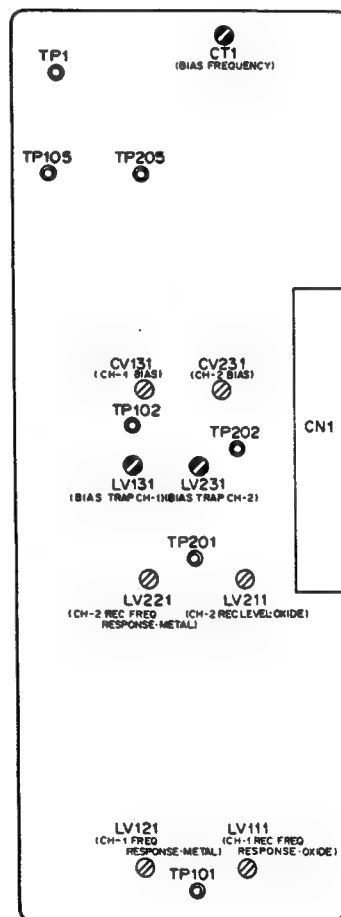
Equipment: Frequency Counter	Board: AU-97/97P board
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• Preparation

- AUDIO IN CH-1/CH-2 connector: No signal
- Insert the BCT-20M and put the unit into the REC mode.
- Connect the Frequency Counter to AC OUT connector on the Audio Noise Meter.

• Adjustment procedures

- Test point : CH-1 : TP102;AU-97/97P
CH-2 : TP202;AU-97/97P
- Adj. point : ① Bias frequency ⚙CT1;AU-97/97P
② Trap
CH-1 : ⚙LV131 (BIAS TRAP CH-1);AU-97/97P
CH-2 : ⚙LV231 (BIAS TRAP CH-2);AU-97/97P
- Spec. : ① $134 \pm 0.5\text{kHz}$
② Minimize the level. (+13dB or less)
WEIGHTING: WIDE BAND



AU-97/97P BOARD (COMPONENT SIDE)

8-4-8. Bias Current Adjustment

Step 1

• Note

- CH-1 and CH-2 should be adjusted at the same time.

• Setting

Equipment: Audio Noise Meter

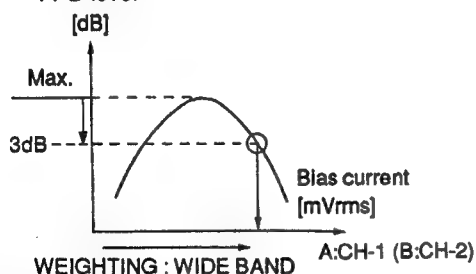
Board: AU-97/97Pboard

• Preparation

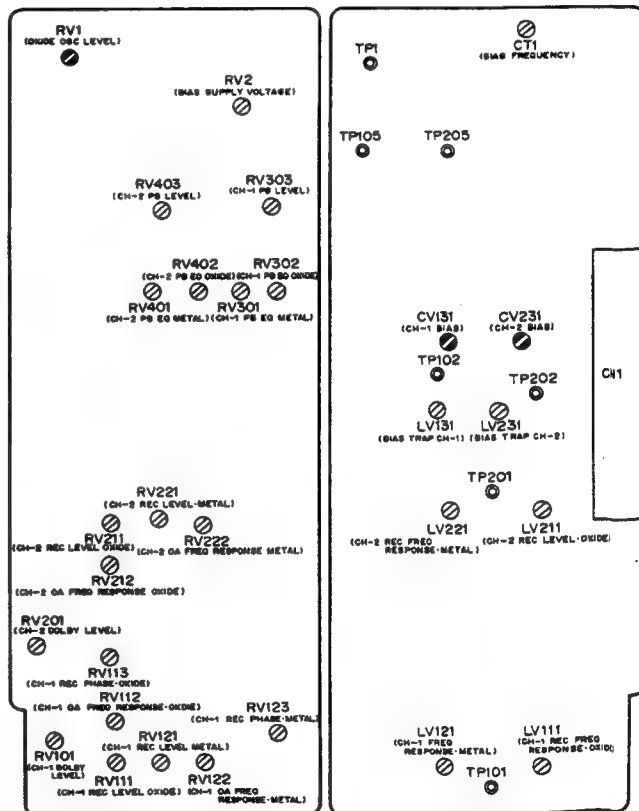
- AUDIO SELECT CH-1/CH-2 SW→MAN
- Preset RV1 (AU-97/97P) to the mechanical center.
- AUDIO IN CH-1/CH-2 connector: 5kHz, +4dBu
- MONITOR control (side panel): Fully turn clockwise
- CH-1 Adjustment: MONITOR SELECT SW → CH-1
- CH-2 Adjustment: MONITOR SELECT SW → CH-2

• Adjustment procedures

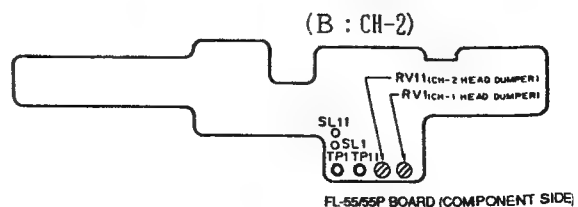
- Test point : CH-1 Adjustment
PB level: EARPHONE connector
(8-ohm load)
Bias current: TP1;FL-55/55P
(GND: E1;FL-55/55P)
CH-2 Adjustment
PB level: EARPHONE connector
(8-ohm load)
Bias current: TP11;FL-55/(GND:
E1;FL-55/55P)
- Adj. point : CH-1: CV131 (CH-1 BIAS);AU-97/97P
CH-2: CV231 (CH-2 BIAS);AU-97/97P
* IF the adjustment is not completed
by CV131 and CV231, adjust by
RV1 (OXIDE OSC LEVEL);AU-97/97P
- Spec. : PB level
[dB]



1. Insert the BCT-20G and put the unit into the REC mode.
2. Minimize the level.
3. Increase the bias current and maximize the PB level.
4. Further increase the bias current, and lower the PB level by 3dB from max level.
5. Take notes of the bias current A: CH-1 (B: CH-2).



AU-97/97P BOARD (SOLDERING SIDE) AU-97/97P BOARD (COMPONENT SIDE)



FL-55/55P BOARD (COMPONENT SIDE)

- Step 2
• Setting

Equipment: Audio Noise Meter	Board: AU-97/97P board
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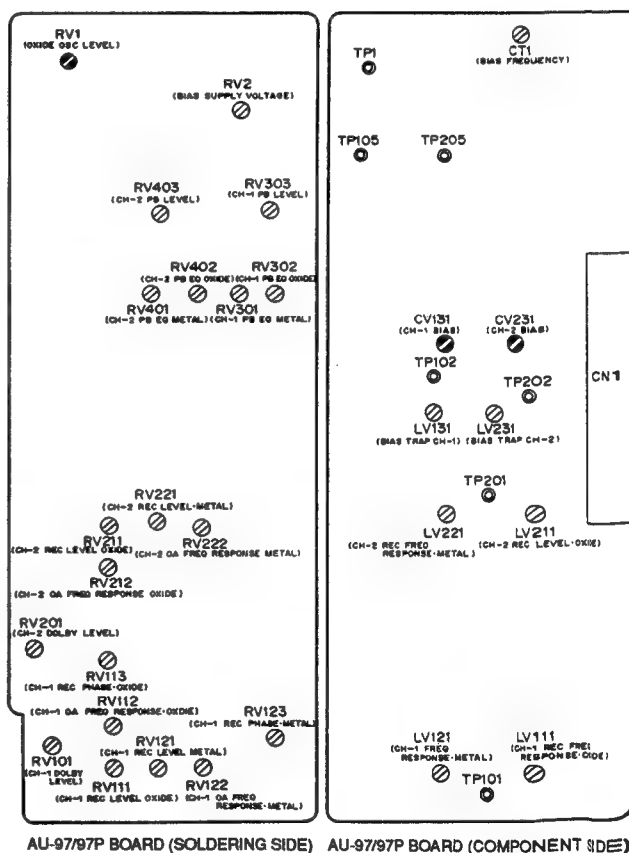
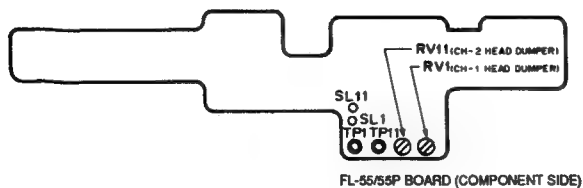
• Preparation

- AUDIO SELECT CH-1/CH-2 SW→MAIN
- Preset RV1 (AU-97/97P) to the mechanical center.
- AUDIO IN CH-1/CH2 connector: 5kHz, + 4dBu
- MONITOR control (side panel): Fully turn clockwise.

• Adjustment procedures

- Test point : CH-1 : TP1;FL-55/55P
CH-2 : TP11;FL-55/55P
(GND : E1;FL-55/55P)
- Adj. point : CH-1 : CV131 (CH-1 BIAS)
;AU-97/97P (BCT-20M)
CH-2 : CV231 (CH-2 BIAS)
;AU-97/97P
CH-1/CH-2=RV1;AU-97/97P
.....(BCT-20G)
- Spec. : CH-1 : $(A+3) \pm 0.3$ mVrms (BCT-20M)
CH-2 : $(B+3) \pm 0.3$ mVrms
- Spec. : CH-1 : $A \pm 0.5$ mVrms (BCT-20G)
CH-2 : $B \pm 0.5$ mVrms
WEIGHTING: WIDE BAND

1. Insert a blank tape (BCT-20M), and set the unit to the REC mode.
2. Assuming the values you took a note of in Step 1 as A and B, adjust as follows:
CH-1 : $(A+3) \pm 0.3$ mVrms
CH-2 : $(B+3) \pm 0.3$ mVrms
3. Insert a blank tape (BCT-20G), and set the unit to the REC mode.
4. Adjust to:
CH-1 : $A \pm 0.5$ mVrms
CH-2 : $B \pm 0.5$ mVrms



• Note

- 1: The bias frequency should be 134 ± 0.5 kHz.
- 2: After adjustments in step3 and 4 are completed, disconnect the extension board and install the AU-97/97P board on the unit then check the specification. If the specification is shifted, readjust step2 taking it into account.

8-4-9. Recording Current Tentative Adjustment

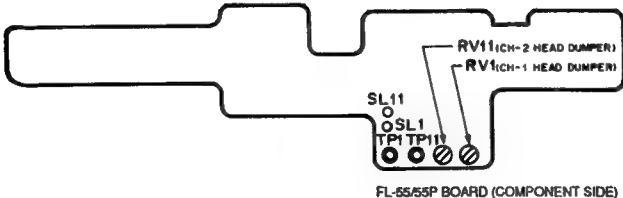
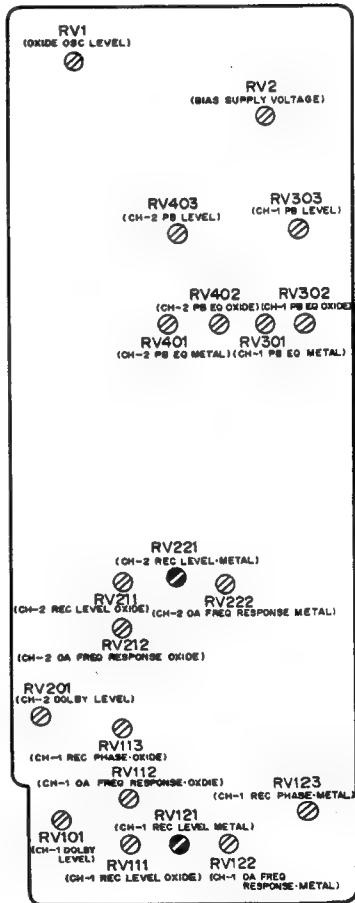
• Setting

Equipment: Audio Noise Meter	Board: AU-97/97P board
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• Preparation

<ul style="list-style-type: none"> AUDIO SELECT CH-1/CH-2 SW→MAN AUDIO IN CH-1/CH-2 connector: 1kHz, +4dBu
--

• Adjustment procedures

<ul style="list-style-type: none"> Test point : BVW-D600/D600P→REC mode CH-1 : TP1;FL-55/55P CH-2 : TP11;FL-55/55P (GND : E1;FL-55/55P) Adj. point : CH-1 : ●RV121 (CH-1 REC LEVEL METAL) ;AU-97/97P CH-2 : ●RV221 (CH-2 REC LEVEL METAL) ;AU-97/97P Spec. : +4.0±0.1dB_μ WEIGHTING: DIN AUDIO <ol style="list-style-type: none"> Insert the BCT-20M and put the unit into the REC mode. Play back the recorded tape using a standard VTR (BVW-75/75P or the equivalent). (DOLBY NR ON/OFF→OFF) LINE OUT CH-1/CH-2connector: Standard VTR (Terminated in 600 ohms.) Confirm that the required specification is met. If the specification is not met, correct the overage and shortage of the level. Then, repeat the procedure 1 through 3. Replace the blank tape with an oxide tape (BCT-20G), and perform the procedures 1 through 4. 	 <p>FL-55/55P BOARD (COMPONENT SIDE)</p>  <p>AU-97/97P BOARD (SOLDERING SIDE)</p>
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8-4-10. Overall Frequency Response Adjustment (Metal)

• Setting

Equipment: Audio Noise Meter

Board: AU-97/97P board

• Preparation

• AUDIO SELECT CH-1/CH-2 SW→MAN

• Adjustment procedures

• Test point : BVW-D600/D600P→REC mode

CH-1 : TP1;FL-55/55P

CH-2 : TP11;FL-55/55P

(GND : E1;FL-55/55P)

• Adj. point : CH-1 : ⦿RV122 (CH-1 A FREQ RESPONSE METAL);AU-97/97P (7~10kHz)

CH-2 : ⦿RV222 (CH-2 A FREQ RESPONSE METAL);AU-97/97P

CH-1 : ⦿RV121 (CH-1 REC LEVEL METAL);AU-97/97P (near 15kHz)

CH-2 : ⦿RV221 (CH-2 REC LEVEL METAL);AU-97/97P

• Spec.

frequency	level (dB)
40Hz	Ref +1.5 -3
1kHz	Reference
7kHz	Ref ±1
10kHz	Ref +1 -1.5
15kHz	Ref +1 -2

WEIGHTING: WIDE BAND

1. Insert the BCT-20M and put the unit into the REC mode.
2. Sequentially supply 40Hz, 1kHz, 7kHz, 10kHz and 15kHz/-16dBu signals to the AUDIO IN CH-1/CH-2 connector for thirty seconds.
3. Play back the recorded tape using a standard VTR (BVW-75/75P or the equivalent). (DOLBY NR ON/OFF SW→OFF)
LINE OUT CH-1/CH-2 connector: Standard VTR (Terminated in 600 ohms.)

4. Correct the overage and shortage of the level in the check procedure and confirm that the required specification is met.

: When the intermediate frequency is met.

CH-1 : Turn ⦿RV122;AU-97/97P counterclockwise.

CH-2 : Turn ⦿RV222;AU-97/97P counterclockwise.

: When the intermediate frequency is high

CH-1 : Turn ⦿RV122;AU-97/97P clockwise.

CH-2 : Turn ⦿RV222;AU-97/97P clockwise.

: When the high frequency is low (near 15kHz)

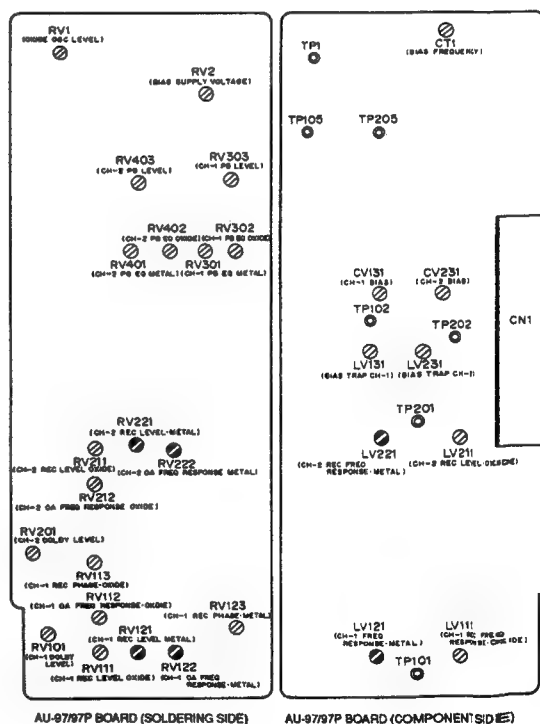
CH-1 : Turn ⦿LV121;AU-97/97P clockwise.

CH-2 : Turn ⦿LV221;AU-97/97P clockwise.

: When the high frequency is high

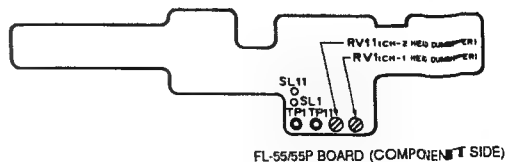
CH-1 : Turn ⦿LV121;AU-97/97P counterclockwise.

CH-2 : Turn ⦿LV221;AU-97/97P counterclockwise.



AU-97/97P BOARD (SOLDERING SIDE)

AU-97/97P BOARD (COMPONENT SIDE)



FL-55/55P BOARD (COMPONENT SIDE)

BVW-D600 (LC)
BVW-D600P (LC,EK)

8-4-11. Overall Frequency Response Adjustment (Oxide)

• Setting

Equipment: Audio Noise Meter

Board: AU-97/97P board

• Preparation

• AUDIO SELECT CH-1/CH-2 SW→MAN

• Adjustment procedures

• Test point : BVW-D600/D600P→REC mode

CH-1 : TP1;FL-55/55P

CH-2 : TP11;FL-55/55P

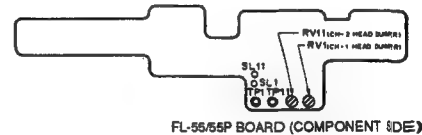
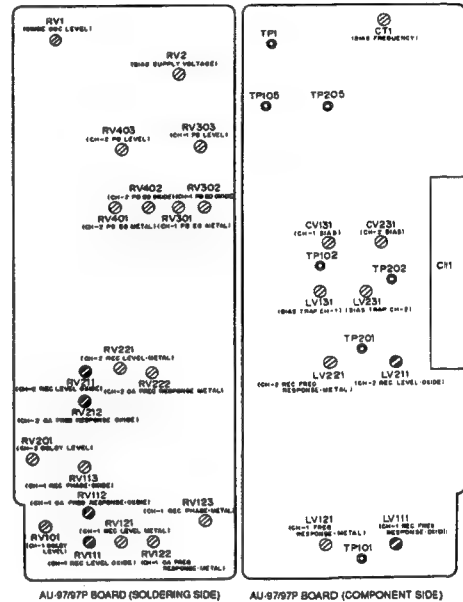
(GND : E1;FL-55/55P)

• Adj. point : CH-1 : ⚙RV112 (CH-1 OA FREQ RESPONSE OXIDE);AU-97/97P (7~10kHz)
CH-2 : ⚙RV212 (CH-2 OA FREQ RESPONSE OXIDE);AU-97/97P
CH-1 : ⚙RV111 (CH-1 REC LEVEL OXIDE);AU-97/97P (near 15kHz)
CH-2 : ⚙RV211 (CH-2 REC LEVEL OXIDE);AU-97/97P

• Spec.

frequency	level (dB)
40Hz	Ref ±3.0
1kHz	Reference
7kHz	Ref ±1
10kHz	Ref +1 -1.5
15kHz	Ref +1 -2

WEIGHTING: WIDE BAND



1. Insert the BCT-20G and put the unit into the REC mode.
2. Sequentially supply 40Hz, 1kHz, 7kHz, 10kHz and 15kHz/-16dBu signals to the AUDIO IN CH-1/CH-2 connector for thirty seconds.
3. Play back the recorded tape using a standard VTR (BVW-75/75P or the equivalent).
(DOLBY NR ON/OFF SW→OFF)
LINE OUT CH-1/CH-2 connector: Standard VTR (Terminated in 600 ohms.)
4. Correct the overage and shortage of the level in the check procedure and confirm that the required specification is met.

• When the intermediate frequency is low (7 to 10kHz)
CH-1 : Turn ⚙RV112;AU-97/97P counterclockwise.
CH-2 : Turn ⚙RV212;AU-97/97P counterclockwise.
• When the intermediate frequency is high
CH-1 : Turn ⚙RV112;AU-97/97P clockwise.
CH-2 : Turn ⚙RV212;AU-97/97P clockwise.

• When the high frequency is low (near 15kHz)
CH-1 : Turn ⚙LV111;AU-97/97P clockwise.
CH-2 : Turn ⚙LV211;AU-97/97P clockwise.
• When the high frequency is high
CH-1 : Turn ⚙LV111;AU-97/97P counterclockwise.
CH-2 : Turn ⚙LV211;AU-97/97P counterclockwise.

8-4-12. Overall Recording Current Adjustment

• Setting

Equipment: Audio Noise Meter	Board: AU-97/97P board
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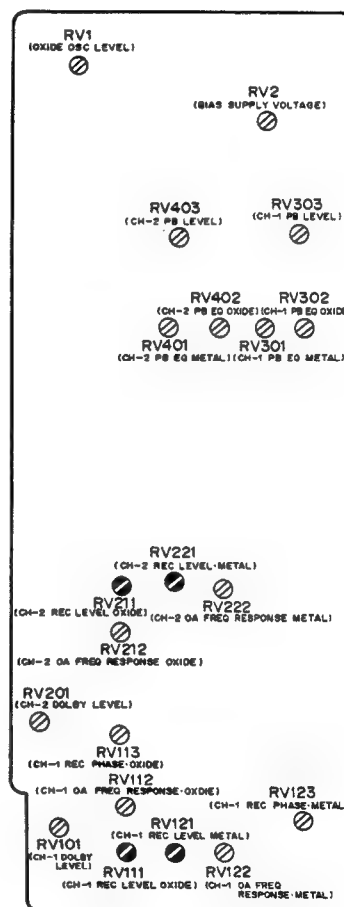
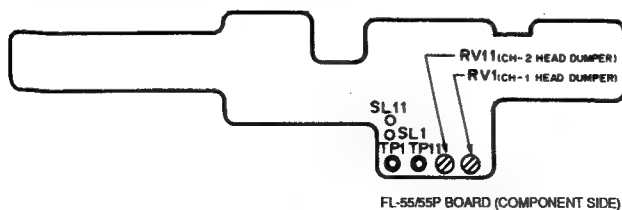
• Preparation

- AUDIO SELECT CH-1/CH-2 SW→MAN
- AUDIO IN CH-1/CH-2 connector: 1kHz, +4dBu

• Adjustment procedures

- Test point : BVW-D600/D600P→REC mode
CH-1 : TP1;FL-55/55P
CH-2 : TP11;FL-55/55P
(GND : E1;FL-55/55P)
- Adj. point : CH-1 : ●RV121
(CH-1 OA FREQ RESPONSE METAL);AU-97/97P
CH-2 : ●RV221
(CH-2 OA FREQ RESPONSE METAL);AU-97/97P
(BCT-20M)
CH-1 : ●RV111
(CH-1 REC LEVEL OXIDE);AU-97/97P
CH-2 : ●RV211
(CH-2 REC LEVEL OXIDE);AU-97/97P
(BCT-20G)
- Spec. : +4.0±0.1dBu
WEIGHTING: DIN AUDIO

1. Insert the BCT-20M and put the unit into the REC mode.
2. Play back the recorded tape using a standard VTR (BVW-75/75P or the equivalent). (Set DOLBY NR ON/OFF SW to OFF).
 - LINE OUT CH-1/CH-2 connector: Standard VTR (Terminated in 600 ohms.)
3. Correct the overage and shortage of the level in the check procedure and confirm that the required specification is met.
4. Replace with a blank tape (BCT-20G), and perform the procedures 1 through 3.



AU-97/97P BOARD (SOLDERING SIDE)

8-4-13. Channel-to-Channel Phase adjustment (Oxide)

• Setting

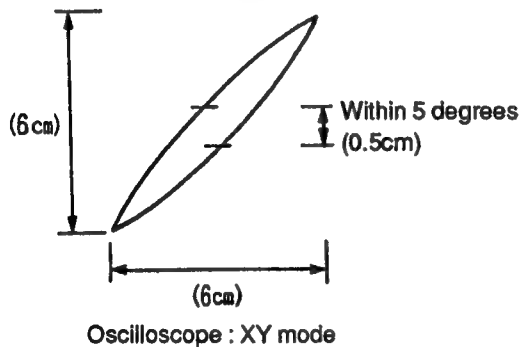
Equipment: Dual Trace Oscilloscope	Board: AU-97/97P board
------------------------------------	------------------------

• Preparation

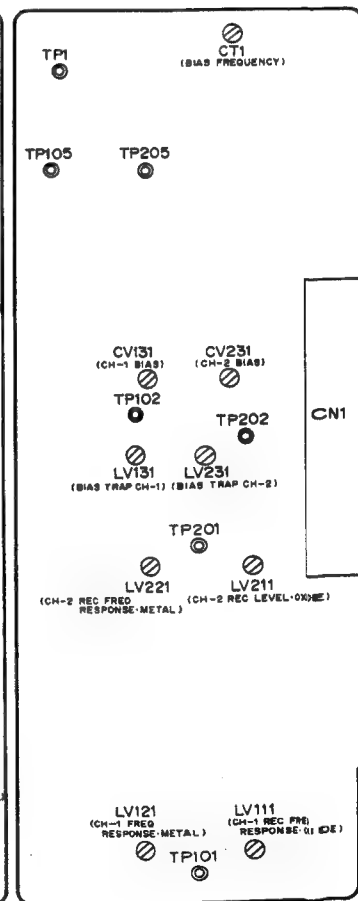
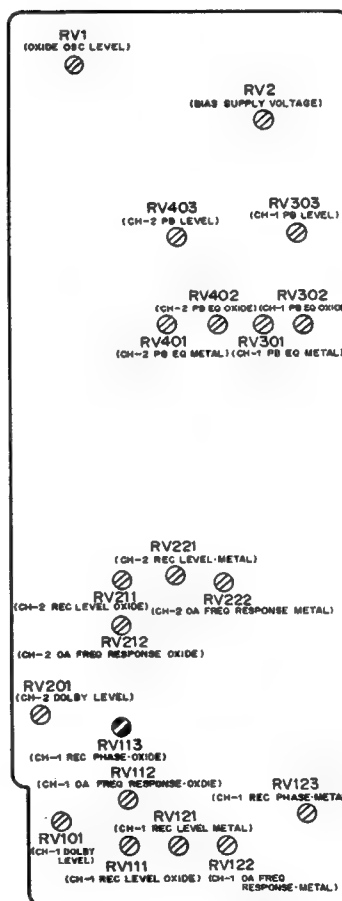
- AUDIO SELECT CH-1/CH-2 SW→MAN
- AUDIO IN CH-1/CH-2 connector: 15kHz, +4dBu

• Adjustment procedures

- Test point : BVW-D600/D600P→REC mode
CH-1 : TP102;AU-97/97P
CH-2 : TP202;AU-97/97P
- Adj. point : ●RV113 (CH-1 REC PHASE OXIDE)
;AU-97/97P
- Spec.



1. Insert the BCT-20G and put the unit into the REC mode.
2. Play back the recorded tape using a standard VTR (BVW-75/75P or the equivalent). (DOLBY NR ON/OFF SW→OFF)
LINE OUT CH-1/CH-2 connector: Standard VTR (Terminated in 600 ohms.)
3. Short between TP35 and TP47 on the extension board with the shorting clip.
4. Correct the shifted portion of the phase in the check procedure and confirm that the required specification is met.
5. After adjustment is completed, remove shorting clip.



• Note

- After adjustment is completed, remove the shorting clip.

8-4-14. Channel-to-Channel Phase adjustment (Metal)

• Setting

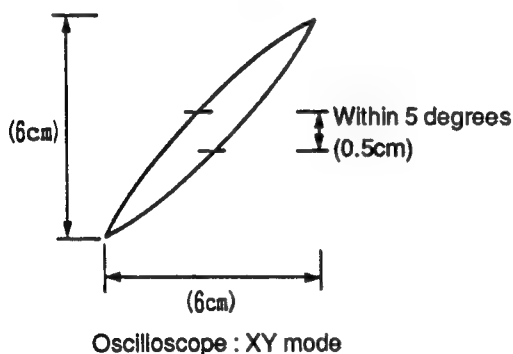
Equipment: Dual Trace Oscilloscope	Board: AU-97/97P board
------------------------------------	------------------------

• Preparation

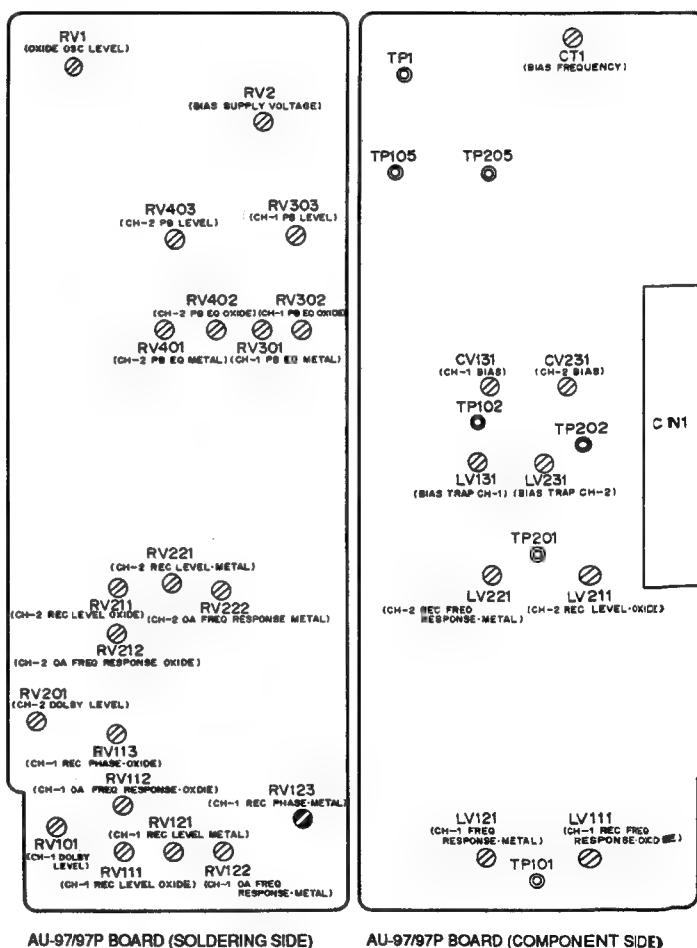
<ul style="list-style-type: none"> AUDIO SELECT CH-1/CH-2 SW→MAN AUDIO IN CH-1/CH-2 connector: 15kHz, +4dBu

• Adjustment procedures

- Test point : BVW-D600/D600P→REC mode
CH-1 : TP102;AU-97/97P
CH-2 : TP202;AU-97/97P
- Adj. point : ⦿RV123 (CH-1 REC PHASE METAL)
;AU-97/97P
- Spec.



- Insert the BCT-20M and put the unit into the REC mode.
- Play back the recorded tape using a standard VTR (BVW-75/75P or the equivalent). (DOLBY NR ON/OFF SW→OFF)
LINE OUT CH-1/CH-2 connector: Standard VTR (Terminated in 600 ohms.)
- Short between TP35 and TP47 on the extension board with the shorting clip.
- Correct the shifted portion of the phase in the check procedure and confirm that the required specification is met.
- After adjustment is completed, remove shorting clip.



• Note

- After adjustment is completed, remove the shorting clip.

8-4-15. PB Amp Reference Level Adjustment

• Setting

Equipment: Audio Noise Meter	Board: AU-97/97P board
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• Preparation

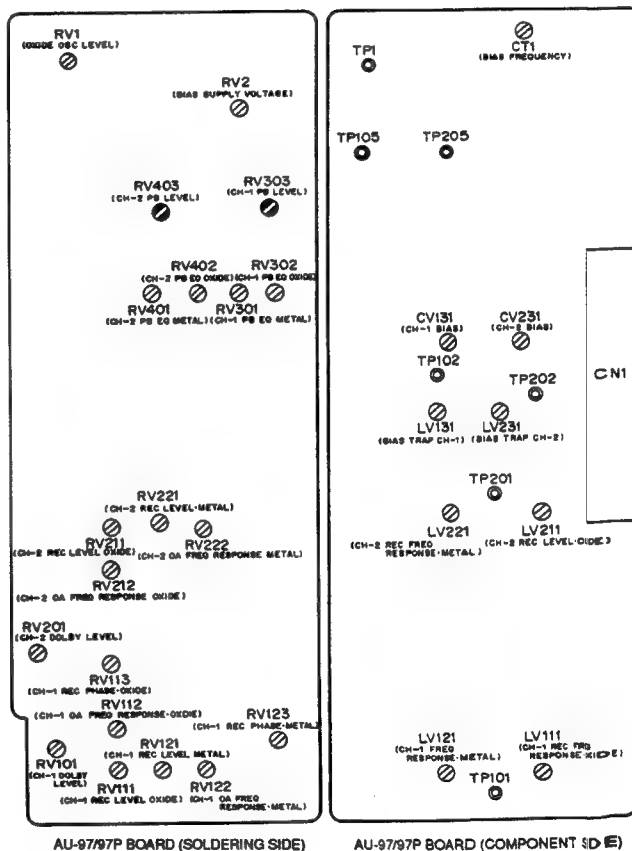
• AUDIO SELECT CH-1/CH-2 SW→MAN

• Adjustment procedures

- Test point : CH-1 : TP105;AU-97/97P
CH-2 : TP205;AU-97/97P
- Adj. point : CH-1 : RV303 (CH-1 PB LEVEL);AU-97/97P
CH-2 : RV403 (CH-2 PB LEVEL);AU-97/97P
- Spec. : ① -10.0 ± 0.1 dBu
② $-10.0 \begin{smallmatrix} +0.5 \\ -1.5 \end{smallmatrix}$ dBu

WEIGHT: DIN AUDIO

- AUDIO IN CH-1/CH-2 connector: 1kHz, +4dBu
- Insert the BCT-20G and put the unit into the REC mode.
- Play back the recorded tape using a standard VTR (BVW-75/75P on the equivalent).
- Adjust to above Spec ①.
- Playback the audio 1KHz/0dB portion of the following alignment tape.
For NTSC : CR8-1A
For PAL : CR8-1APS
- Adjust to above Spec ②.
- If the specification is not met, readjust step 1. But if not, perform the audio head height adjustment in Sec. 6-13.



8-4-16. PB Amp Frequency Response Adjustment

Step 1

• Setting

Equipment: Audio Noise Meter	Board: AU-97/97P board
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• Preparation

- AUDIO SELECT CH-1/CH-2 SW→MAN
- DOLBY NR ON/OFF SW→ON
- Connect the PB Adaptor (VA-500 for NTSC or VA-500P for PAL). (DOLBY NR ON/OFF SW→ON)
- Insert the BCT-20G and put the unit into the REC mode.
- Sequentially supply 40Hz, 1kHz, 7kHz, 10kHz and 15kHz/−16dBu signals to the AUDIO IN CH-1/CH-2 connector for thirty seconds.
- Select the Audio PB channel CH-1/CH-2 of the PB Adaptor and perform the adjustment. (Spec ①)
- Insert the BCT-20M and put the unit into the REC mode.
- Sequentially supply 40Hz, 1kHz, 7kHz, 10kHz and 15kHz/−16dBu signals to the AUDIO IN CH-1/CH-2 connector for thirty seconds.
- Select the Audio PB channel CH-1/CH-2 of the PB Adaptor and perform the adjustment. (Spec ②)
- AUDIO OUT connector/PB Adaptor (Terminated in 600 ohms.)

• Adjustment procedures

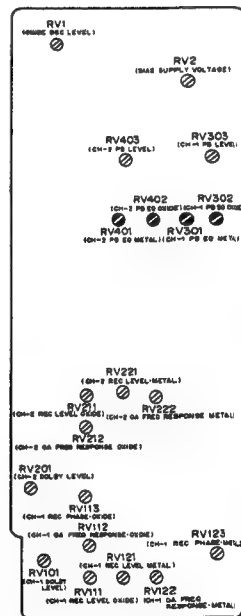
- Test point : CH-1 : TP1;FL-55/55P
CH-2 : TP11;FL-55/55P
- Adj. point : Intermediate-frequency response
CH-1 : ●RV302 (CH-1 PB EQ OXIDE);AU-97/97P) (BCT-20G)
CH-2 : ●RV402 (CH-2 PB EQ OXIDE);AU-97/97P)
CH-1 : ●RV301 (CH-1 PB EQ METAL);AU-97/97P) (BCT-20M)
CH-2 : ●RV401 (CH-2 PB EQ METAL);AU-97/97P)
High-frequency response
CH-1 : ●RV1 (CH-1 HEAD DUMPER);FL-55/55P) (BCT-20G and BCT-20M)
CH-2 : ●RV11 (CH-2 HEAD DUMPER);FL-55/55P)

• Spec. : ① Oxide

Frequency	Level (dB)
40Hz	Ref ±3
1kHz	Reference
7kHz	Ref ±3
10kHz	Ref ±3
15kHz	Ref ±3

② Metal

Frequency	Level (dB)
40Hz	Ref +1.5 −3
1kHz	Reference
7kHz	Ref ±1
10kHz	Ref +1.5 −3.0
15kHz	Ref +1.5 −3.0

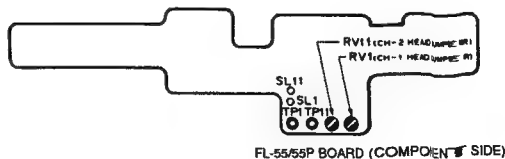


AU-97/97P BOARD (SOLDERING SITE)

WEIGHTING: WIDE BAND

Adjust so that the specifications of the oxide and metal are met.

When the high-frequency level is low after ●RV1 and ●RV11 on the FL-55/55P board are turned fully clockwise, solder the points SL11 or SL1 on the FL-55/55P board and readjust.



• Note

- After adjustment is completed, disconnect the PB Adaptor.

Step 2

• Setting

Equipment: Audio Noise Meter	Board: AU-97/97P board
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• Preparation

- AUDIO SELECT CH-1/CH-2 SW→MAN
- DOLBY NR ON/OFF SW→OFF
- Play back the audio 1kHz (reference), 40Hz, 7kHz, 10kHz and 15kHz signals on the following alignment tape.
For NTSC : CR8-1A
For PAL : CR8-1APS
- AUDIO OUT connector/PB Adaptor (terminated in 600 ohms.)

• Adjustment procedures

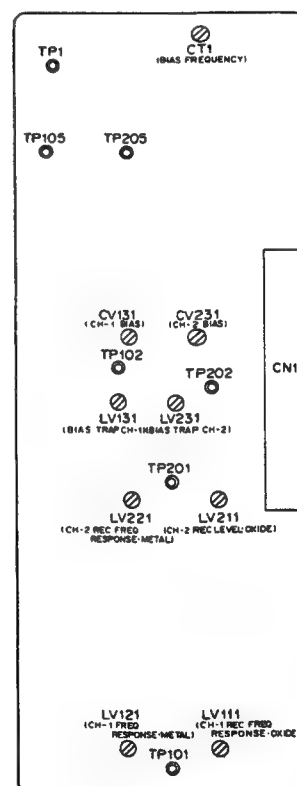
- Test point : CH-1 : TP105;AU-97/97P
CH-2 : TP205;AU-97/97P

• Spec.

Frequency	Level (dB)
40Hz	Ref ± 3
1kHz	Reference
7kHz	Ref ± 3
10kHz	Ref ± 3
15kHz	Ref ± 3

WEIGHTING: WIDE BAND

- If the specification is not met, readjust step 1. But if not, perform the tape run alignment in Sec. 6.



AU-97/97P BOARD (COMPONENT SIDE)

8-4-17. AFM Carrier Frequency Adjustment

• Setting

Equipment: Frequency Counter

Board: AFM-6/6P board

• Preparation

- AUDIO IN CH-1/CH-2 connector: No signal
- Insert the BCT-20M and put the unit into the REC mode.

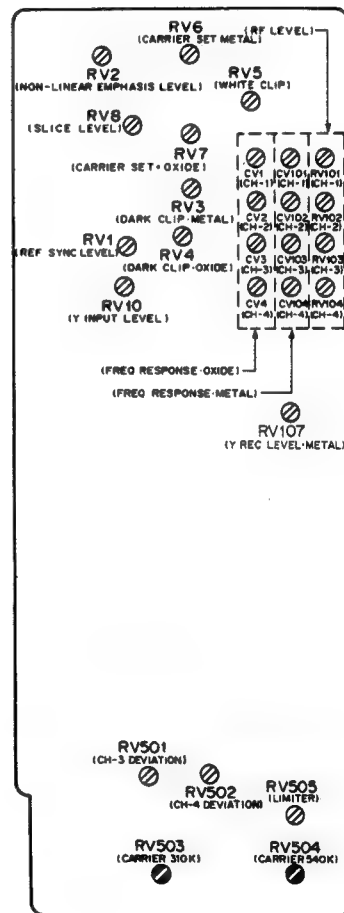
• Adjustment procedures

1. CARRIER 310KHz Adj.

- Test point : TP35; Extension board: AFM-6/6P
- Adj. point : ●RV503 (CARRIER 310K); AFM-6/6P
- Spec. : $310 \pm 1\text{kHz}$

2. CARRIER 540KHz Adj.

- Test point : TP36; Extension board: AFM-6/6P
- Adj. point : ●RV504 (CARRIER 540K); AFM-6/6P
- Spec. : $540 \pm 1\text{kHz}$



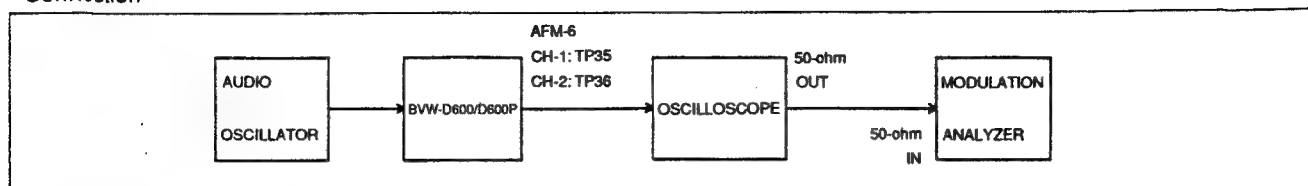
AFM-6/6P BOARD (SOLDERING SIDE)

8-4-18. AFM Deviation Adjustment

• Setting

Equipment: Frequency Counter	Board: AFM-6/6P board
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• Connection



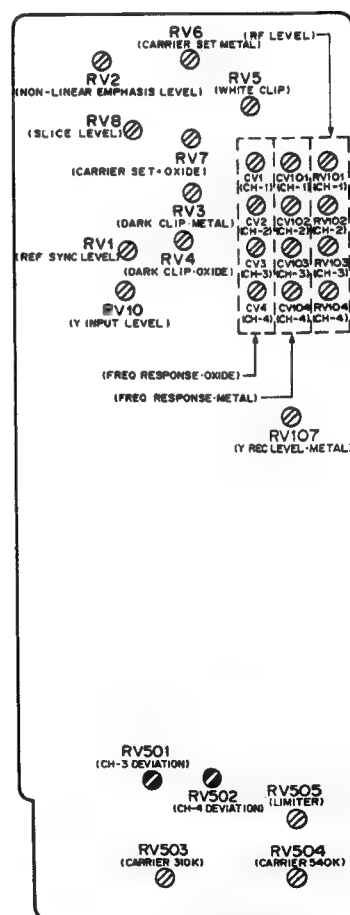
• Preparation

- AUDIO IN CH-1/CH-2 connector: 400Hz, +4dBu (Ref. Level)
- Insert the BCT-20M and put the unit into the REC mode.
- Play back the recorded tape using a standard VTR (BVW-75/75P or equivalent).

• Adjustment procedures

- Test point : Standard VTR: LINE OUT CH-3/CH-4 connector
- Adj. point : ⦿RV501 (CH-3 DEVIATION);AFM-6/6P
⦿RV502 (CH-4 DEVIATION);AFM-6/6P
- Spec. : +4±0.1dBu

1. Adjust ⦿RV501;AFM-6/6P.
2. Insert the BCT-20M and put the unit into the REC mode.
3. Play back the recorded tape using a standard VTR (BVW-75/75P or the equivalent).
4. Confirm that the specification is met.
5. If not, repeat the procedure 1 through 4 several times.
6. Adjust ⦿RV502 in the same manner as the procedure 1 through 5.



AFM-6/6P BOARD (SOLDERING SIDE)

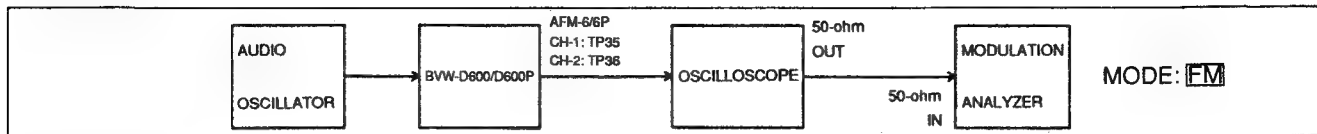
8-4-19. AFM Over Modulation Limiter Adjustment

Step

• Setting

Equipment: Modulation analyzer	Board: AFM-6/6P board
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• Connection



• Preparation

- S103/TC-48B→OFF
- S203/TC-48B→OFF
- AUDIO SELECT CH-1/CH-2 SW→MAN
- AUDIO IN CH-1/CH-2 SW →REAR MIC
- AUDIO IN CH-1/CH-2 connector: 400Hz, -40dBu (Ref. level +20dBu)
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

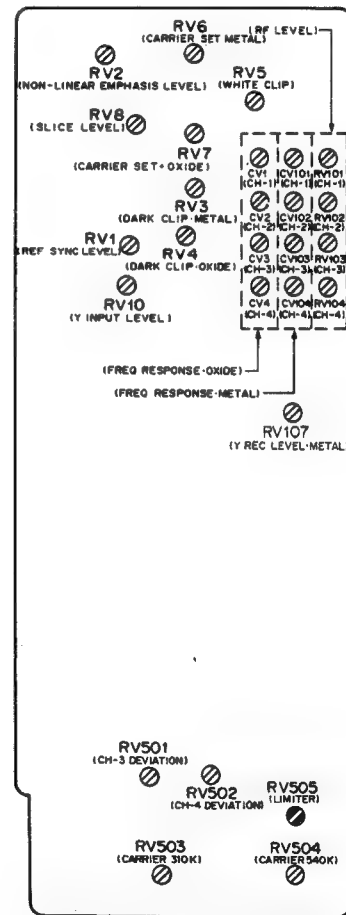
- Test point : CH-1 : TP505;AFM-6/6P
CH-2 : TP506;AFM-6/6P
- Adj. point : RV505 (LIMITER);AFM-6/6P
- Spec. : $77 \pm 2\text{kHz}$

The point where a wave-form starts to be distorted.

OK
(CORRECT)

OK
(CORRECT)

INCORRECT



AFM-6/6P BOARD (SOLDERING SIDE)

• Note

- After adjustment is completed, set the S103 and S203 on the TC-48B/48BP board to ON.

The video system adjustment method has been changed along with the changes of the video board (VDA-11). Adjust according to the serial number on the right.

Serial No.	Adjustment page
10001 through 10365 (UC)	8-31~8-88
40001 through 40165 (EK)	

8-5. VIDEO SYSTEM ADJUSTMENT

[Equipment]

- Component signal Generator: TEKTRONIX TSG-300 or the equivalent
- Digital Voltmeter
- Dual trace Oscilloscope
- Frequency counter
- Sweep Generator
- Spectrum Analyzer
- DC power: AC-550/550CE or the equivalent
- Waveform Vector Monitor: TEKTRONIX 1750A (for NTSC)/1751A (for PAL) or the equivalent
- Standard VTR player: BVW-75/75P or the equivalent
- Rec Current Adj Tool
 - For NTSC : EW-571 (J-6335-710-A)
 - For PAL : EW-594 (J-6335-940-A)
- Video signal Input Board: JX-250 (J-6392-500-A)
- Deviation checker: EW-579 (J-6335-790-A)
- Setup attenuator tool: EW-607 (J-6336-070-A)
- * NOTE: This fixture (EW-607) is the same that fixture already has been used for BVW-300/300A/400/400A series.
- Blank tape: BCT-20G or BCT-20M
- Alignment Tape:
 - For NTSC : CR5-2A (8-960-097-44): OXIDE
 - For NTSC : CR5-1B (8-960-096-41): METAL
 - For PAL : CR5-2APS (8-960-098-44): OXIDE
 - For PAL : CR5-1BPS (8-960-096-91): METAL

[Switches setting on the function panel]

Do not change the setting below unless otherwise specified.

- VTR switch: STBY
- OUTPUT/DCC selector: BARS

* Alignment tape : (OXIDE)

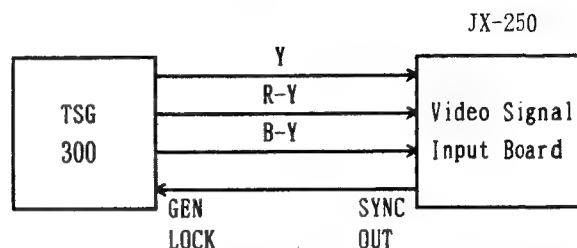
- For NTSC : CR5-2A
- For PAL : CR5-2APS

NOTE: The Alignment tape marked "A" at the TOP of the tape number as "TAPE No. A0123..." are made change in the signal contents.
Then, some adjustments are made change.

TIME min.Sec	VIDEO TRACK	DESCRIPTION
0:00	75% Color Bar	
2:00		
	Multi Burst	Y: 0.5, 1, 2, 3, 4.1, 4.5 MHz C: 0.2, 0.5, 1, 1.5 MHz
6:00		
	Bowtie & 10T	C: No Signal
9:00	Pulse & Bar	
11:00		
	Sw/P Shifted	
13:00	Composite Monoscope (Switching position is shifted.)	Video Phase
15:00		

[Preparation] (When using the signal except from the built-in color-bar.)

1. Remove the DA-66 board.
2. Insert the Video Signal Input Board and connect as illustrated below.



3. After adjustment is completed, install the DA-66 board and check (or readjust) Sec. 8-5-3 and 8-5-14 using a BARS signal from the camera.

* Alignment tape : (METAL)

- For NTSC : CR5-1B
- For PAL : CR5-1BPS

TIME min.sec	VIDEO	AFM
0:00	RF SWEEP Marker 1, 2, 4, 6, 8, 10, 12 MHz	No-Sig nal
2:00	60% H.SWEEP (CTDM) Marker 0, 5, 1, 2, 3, 4, 5 MHz	
5:00	PULSE & BAR (CTDM)	
8:00	MULTI BURST Y: 0.5, 1, 2, 3, 4.1, 4.5 MHz (For NTSC) 0.5, 1.2, 4, 5, 5.5 MHz (For PAL) C: 0.2, 0.5, 1, 1.5, 2 MHz	
11:00	PULSE & BAR	
14:00	100% COLOR BARS	400 Hz sine wave (25 kHz deviation)
16:30		(75 kHz deviation)
17:00	50% BOWTIE & 10T	No-Sig nal
19:00	LINE 17A SIGNAL	
22:00	QUAD PHASE	
24:00	FLAT FIELD	
26:00	100% COLOR BARS with dropout	
28:00	COMPOSITE H.SWEEP with VISC	
30:00		

8-5-1. CCD Clock VCO Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

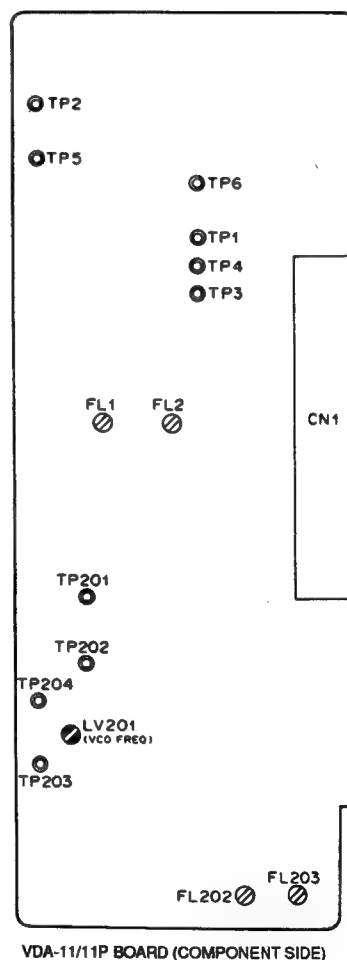
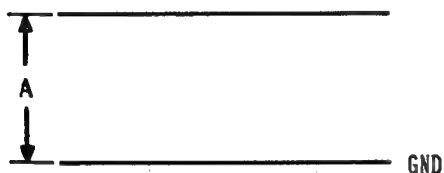
Board: VDA-11/11P board

• Preparation

- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP201;VDA-11/11P
- Adj. point : \odot LV201 (VCO FREQ);VDA-11/11P
- Spec. : $A=2.5\pm0.05V_{dc}$



VDA-11/11P BOARD (COMPONENT SIDE)

8-5-2. CCD Clock Bias Adjustment

• Setting

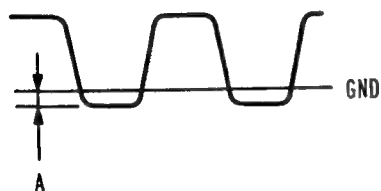
Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
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• Preparation

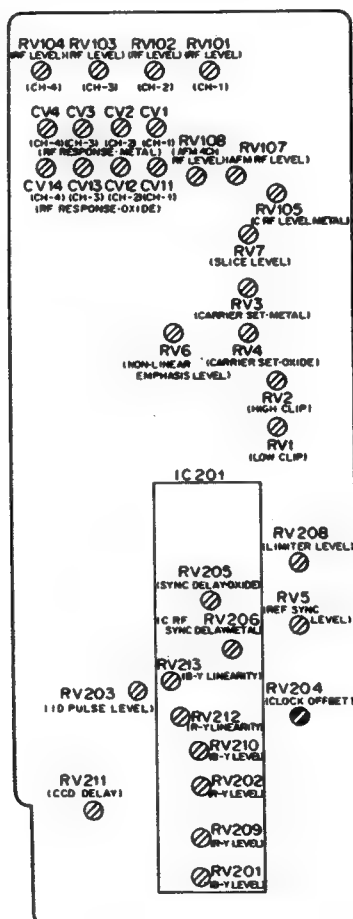
- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

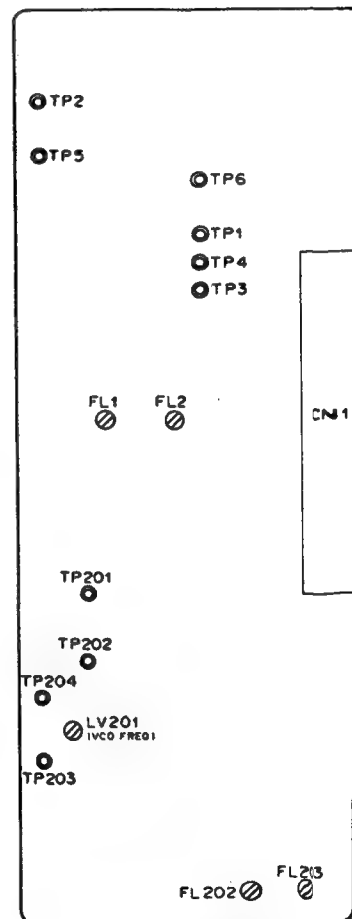
- Test point : TP202;VDA-11/11P
- Adj. point : \odot RV204 (CLOCK OFFSET);VDA-11/11P
- Spec. : $A = -0.5 \pm 0.1 \text{Vdc}$



TRIG : INT



VDA-11/11P BOARD (SOLDERING SIDE)



VDA-11/11P BOARD (COMPONENT SIDE)

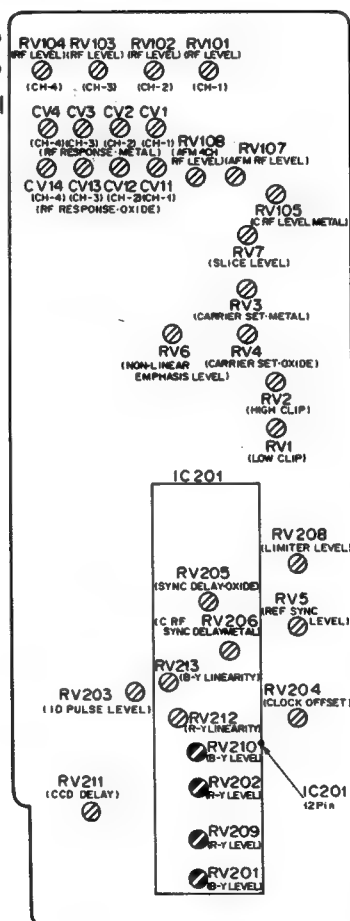
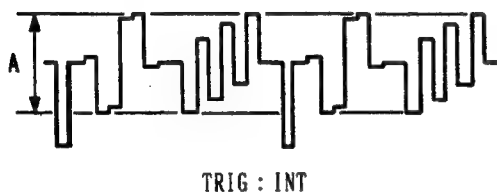
3. VTR SYSTEM ALIGNMENT

- Preparation

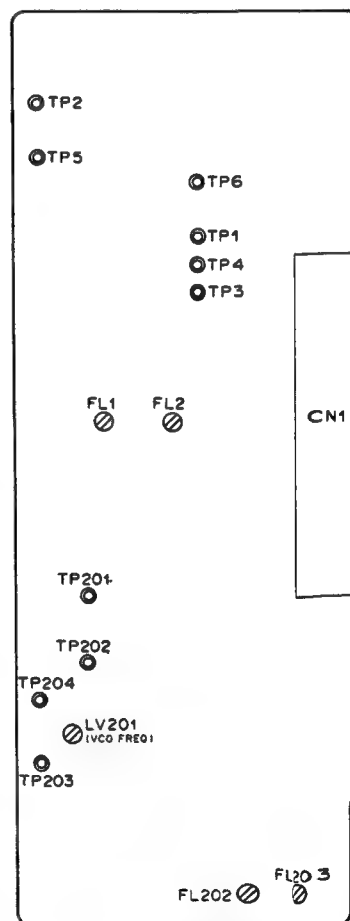
Board: VDA-11/11P board

- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.
- Extend VDA board using the extension board.

- Test point : TP3;VDA-11/11P
- Adj. point : B-Y Level
 - ⊙RV201 (B-Y LEVEL);VDA-11/11P
 - ⊙RV209 (B-Y LEVEL);VDA-11/11P
 - : R-Y Level
 - ⊙RV202 (R-Y LEVEL);VDA-11/11P
 - ⊙RV210 (R-Y LEVEL);VDA-11/11P
- Spec. : A = CCD output level in each channel
= $0.5 \pm 0.01V$



VDA-11/11P BOARD (SOLDERING SIDE)



VDA-11/11P BOARD (COMPONENT SIDE)

8-5-4. High Chroma Slice Level Adjustment

• Setting

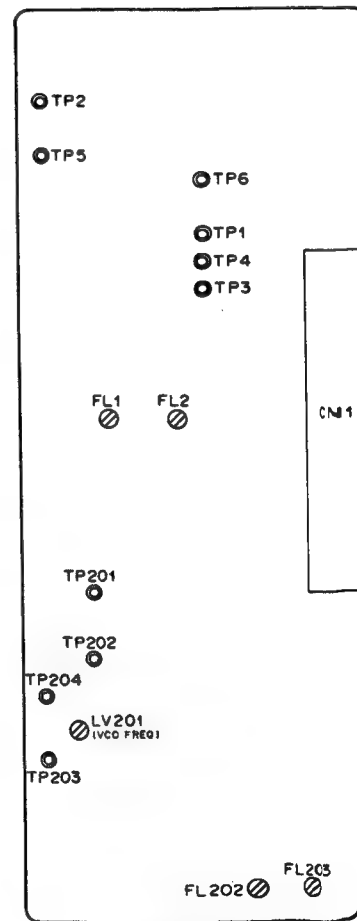
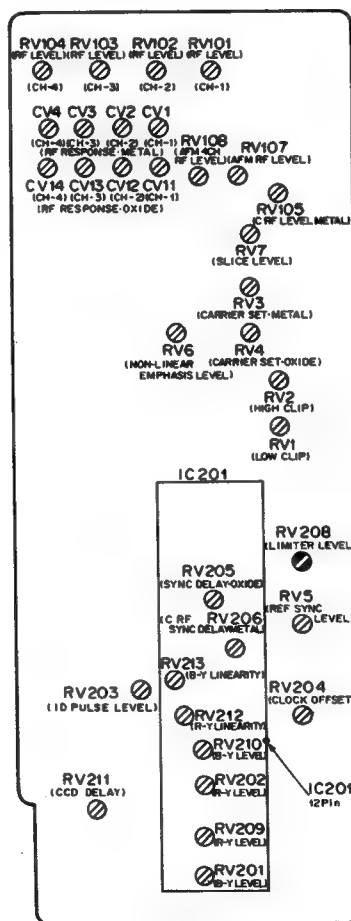
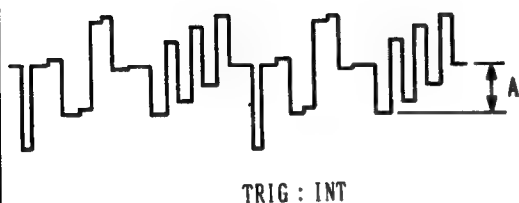
Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
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• Preparation

- Input signal: 75% color-bar (chroma: +6 dB)
- Insert the BCT-20M and put the unit into the REC mode.
- Extend VDA board using the extension board.
- If the chroma level of the Signal Generator can not be +6dB, remove the R-Y, B-Y terminated resistors R8 (82-ohm) and R10 (82-ohm) on the Video Signal Input Board (JX-250) temporarily and perform the adjustment.

• Adjustment procedures

- Test point : TP3;VDA-11/11P
- Adj. point : RV208 (LIMITER LEVEL);VDA-11/11P
- Spec. : For NTSC : $A = 0.367 \pm 0.05V$
For PAL : $A = 0.442 \pm 0.05V$



8-5-5. C REF Sync Level Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

Board: VDA-11/11P board

• Preparation

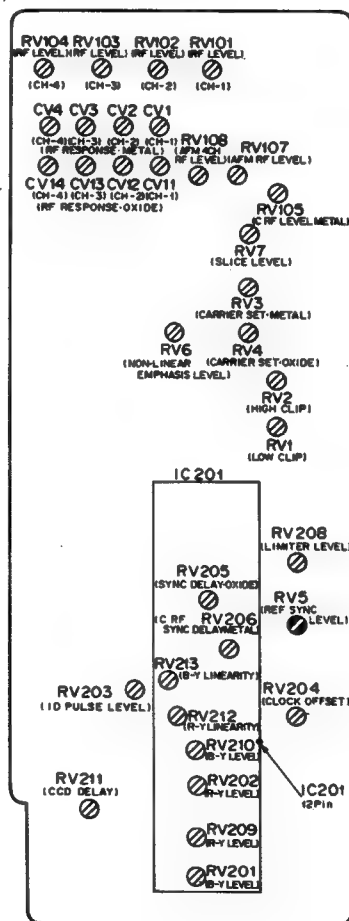
- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.
- Extend VDA board using the extension board.

• Adjustment procedures

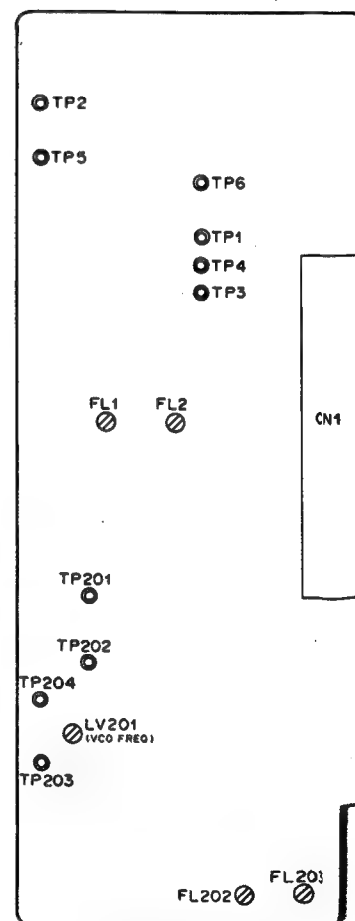
- Test point : TP3;VDA-11/11P
- Adj. point : \odot RV5 (REF SYNC LEVEL);VDA-11/11P
- Spec. : For NTSC : $A = 0.525 \pm 0.01V$
For PAL : $A = 0.598 \pm 0.01V$



TRIG : INT



VDA-11/11P BOARD (SOLDERING SIDE)



VDA-11/11P BOARD (COMPONENT SIDE)

8-5-6. C REF Sync Trapezoid Adjustment

• Setting

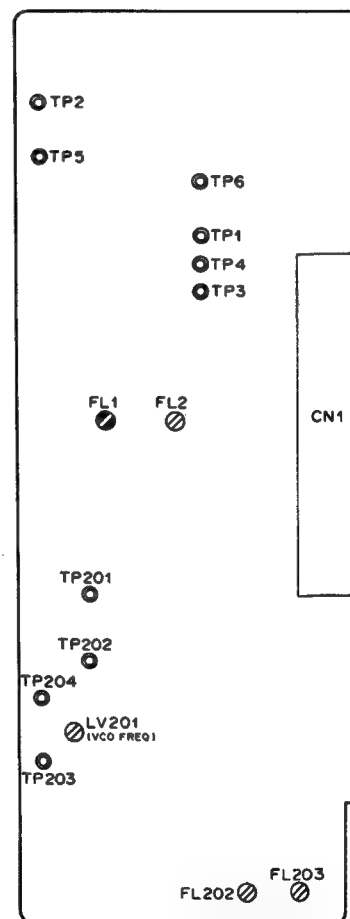
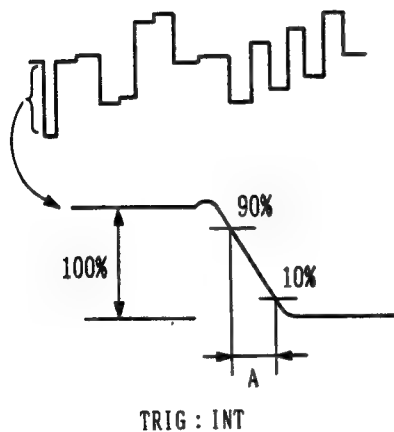
Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
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• Preparation

- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.
- Extend VDA board using the extension board.

• Adjustment procedures

- Test point : TP3;VDA-11/11P
- Adj. point : \odot FL1;VDA-11/11P
- Spec. : $A = 220 \pm 20 \text{ nsec}$



VDA-11/11P BOARD (COMPONENT SIDE)

8-5-7. ID Pulse Level Adjustment

• Setting

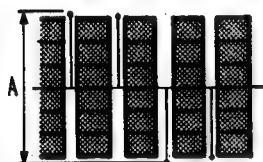
Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
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• Preparation

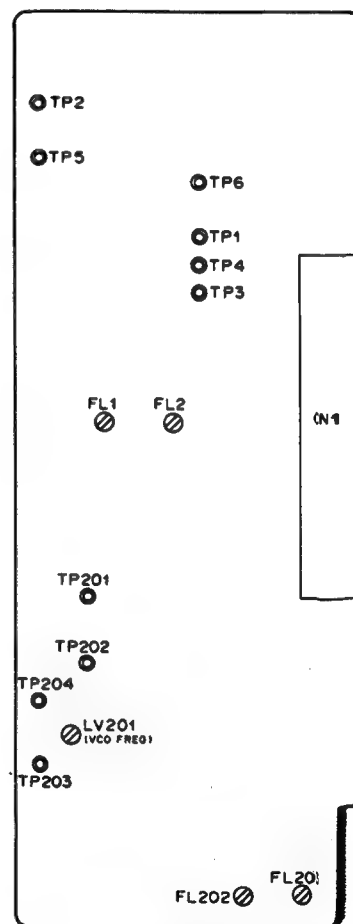
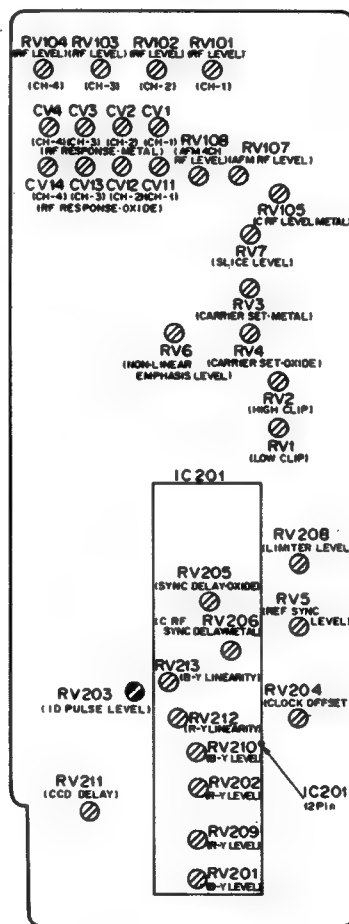
- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.
- Extend VDA board using the extension board.

• Adjustment procedures

- Test point : TP3;VDA-11/11P
- Adj. point : \odot RV203 (ID PULSE LEVEL);VDA-11/11P
- Spec. : $A=0.5\pm0.05V$



TRIG : TP8/EXT Board



8-5-8. C Carrier/Deviation Adjustment

1) Adjustment using Spectrum Analyzer

Step.1

• Setting

Equipment: Spectrum Analyzer

Board: VDA-11/11P board

• Preparation

- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.
- Extend VDA board using the extension board.

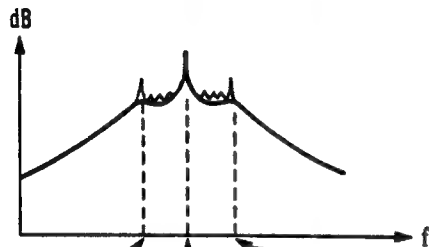
• Adjustment procedures

- Test point : TP5;VDA-11/11P
- Adj. point : Carrier adjustment
 ●RV3
 (CARRIER SET METAL);VDA-11/11P

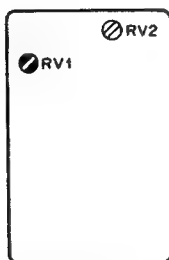
Deviation adjustment

- RV1 (IC2);VDA-11/11P

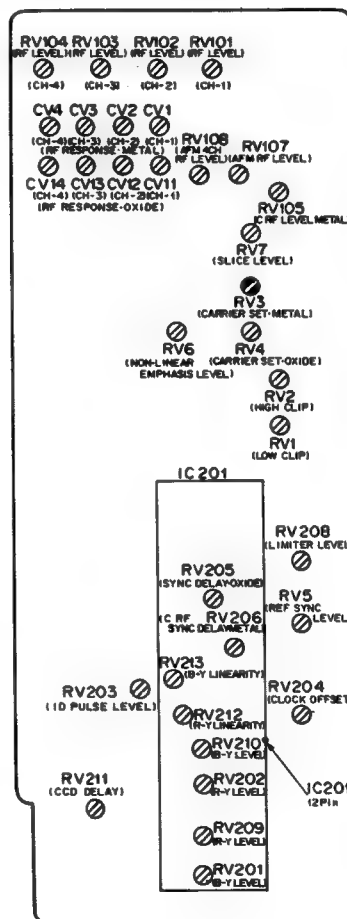
- Spec. : Carrier adjustment
 Set the center peak level as follows.
 For NTSC ... 5.3MHz
 For PAL 6.1MHz
- : Deviation adjustment
 Set the gap between the two peaks to 1MHz.
 For NTSC ... 4.8MHz and 5.8MHz
 For PAL 5.6MHz and 6.6MHz



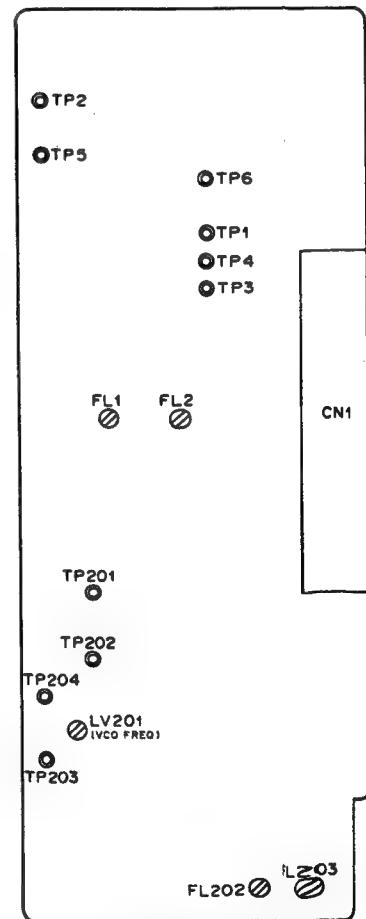
For NTSC...4.8MHz 5.3±0.005MHz 5.8MHz
 For PAL...5.6MHz 6.1±0.005MHz 6.6MHz



HIC (IC2)
 (COMPONENT SIDE)
 —On the VDA-11/11P Board—



VDA-11/11P BOARD (SOLDERING SIDE)



VDA-11/11P BOARD (COMPONENT SIDE)

Step 2

• Setting

Equipment: Spectrum Analyzer

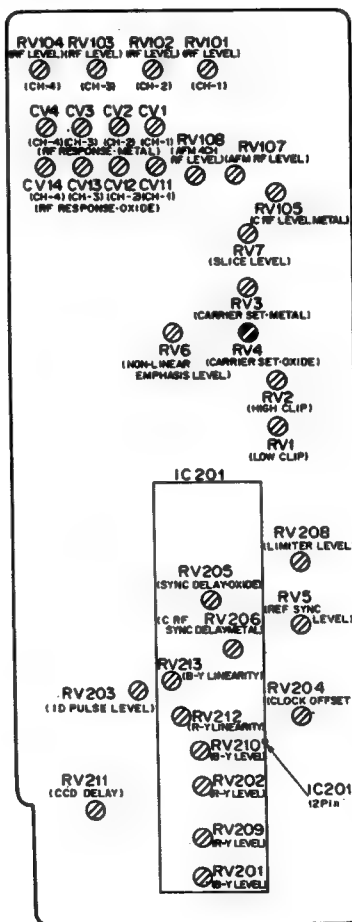
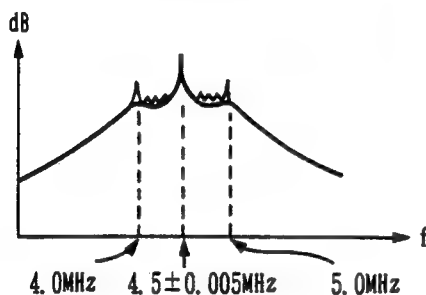
Board: VDA-11/11P board

• Preparation

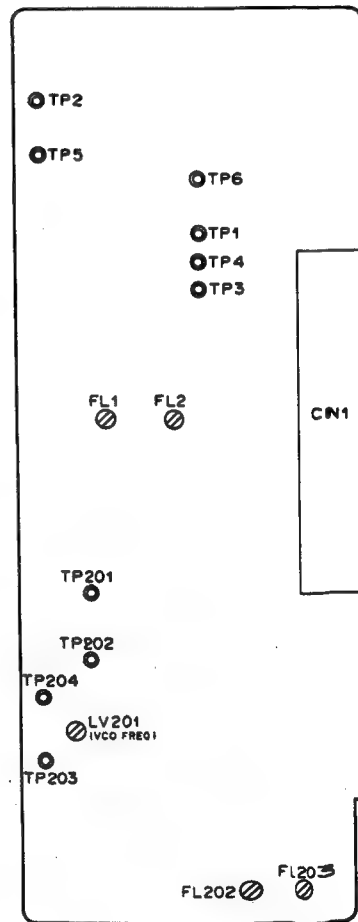
- built-in color-bar
- Insert the BCT-20G and put the unit into the REC mode.
- Extend VDA board using the extension board.

• Adjustment procedures

- Test point : TP5;VDA-11/11P
- Adj. point : Carrier adjustment
 ○RV4
 (CARRIER SET OXIDE)
 ;VDA-11/11P
- Spec. : Carrier adjustment
 Set the center peak level to 4.5MHz.



VDA-11/11P BOARD (SOLDERING SIDE)



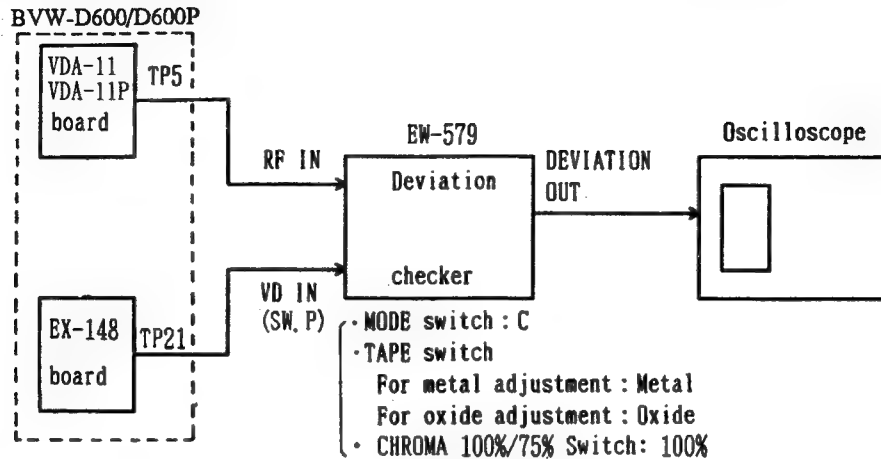
VDA-11/11P BOARD (COMPONENT SIDE)

2) Adjustment using Deviation Checker

- Setting

Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
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- **Connection**



- Preparation

- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.
- After metal adjustment is completed, insert the BCT-20G and put the unit into the REC mode.
- Extend VDA board using the extension board.

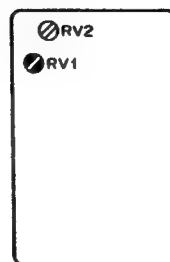
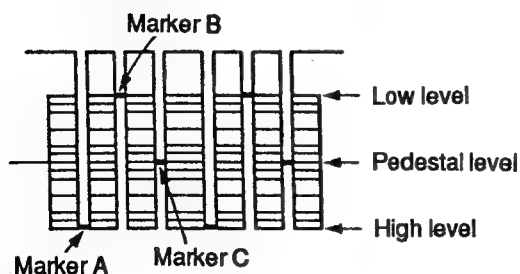
- Adjustment procedures

- **Test point** : DEVIATION OUT (DEVIATION CHECKER)
- **Adj. point** :
 - METAL (BCT-20M)
Marker C adjustment (Carrier setting)
● RV3 (CARRIER SET-METAL)
;VDA-11/11P
Marker A and B adjustment (deviation)
● RV1 (IC2);VDA-11/11P
 - OXIDE (BCT-20G)
Marker C Adjustment (Carrier setting)
● RV4 (CARRIER SET-OXIDE)
;VDA-11/11P
- **Spec.** : Procedure
 1. Set marker C to the pedestal level.
 2. Set marker A to the high level and marker B to the low level.
 3. Set oxide marker C to the pedestal level.

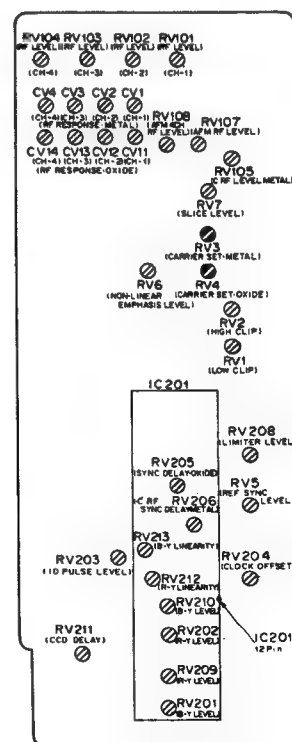
- Spec.

: Procedure

1. Set marker C to the pedestal level.
2. Set marker A to the high level and marker B to the low level.
3. Set oxide marker C to the pedestal level.



HIC (IC2)
(COMPONENT SIDE)
- On the VDA-11 Board -



VDA-11/P BOARD (SOLDERING SIDE)

8-5-9. C Low Clip Adjustment

• Setting

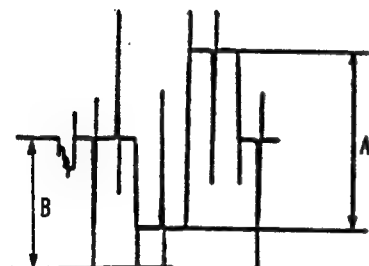
Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
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• Preparation

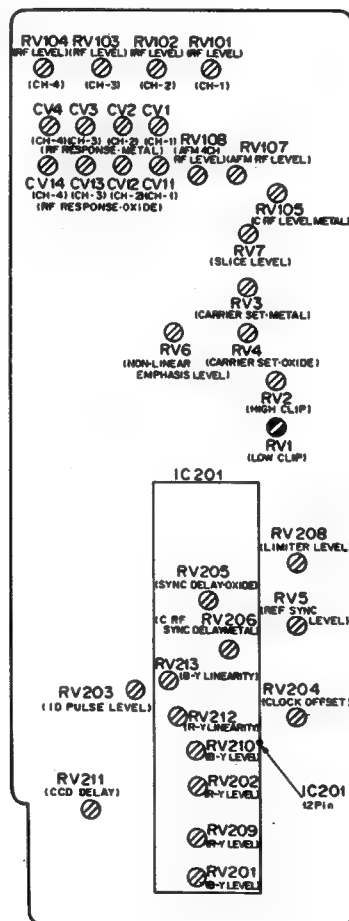
- Input signal: pulse & bar (3T, 2T)
- Insert the BCT-20G and put the unit into the REC mode.
- Extend VDA board using the extension board.

• Adjustment procedures

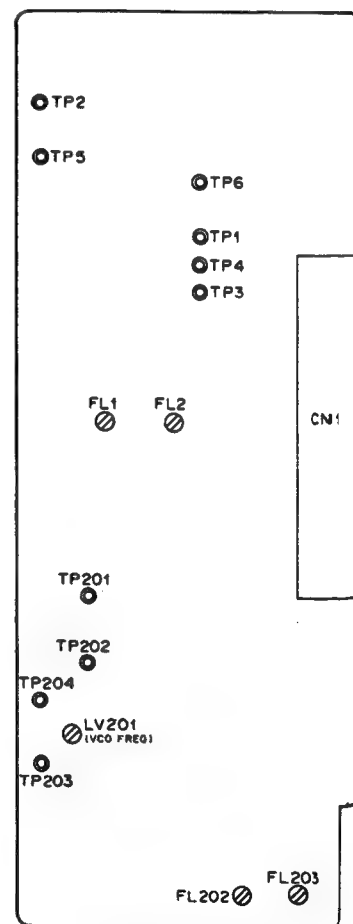
- Test point : TP2;VDA-11/11P
- Adj. point : \odot RV1 (LOW CLIP)
;VDA-11/11P
- Spec. : A=R-Y/B-Y level
A=100% (reference)
For NTSC : $B=A \times 160 \pm 5\%$
For PAL : $B=A \times 120 \pm 5\%$



TRIG : HD/SG



VDA-11/11P BOARD (SOLDERING SIDE)



VDA-11/11P BOARD (COMPONENT SIDE)

8-5-10. C High Clip Adjustment


- Setting

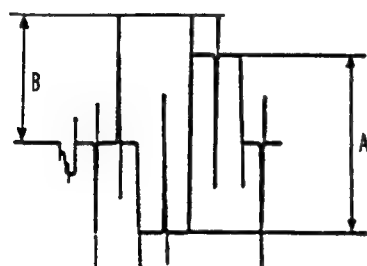
Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
------------------------------------	-------------------------

- Preparation

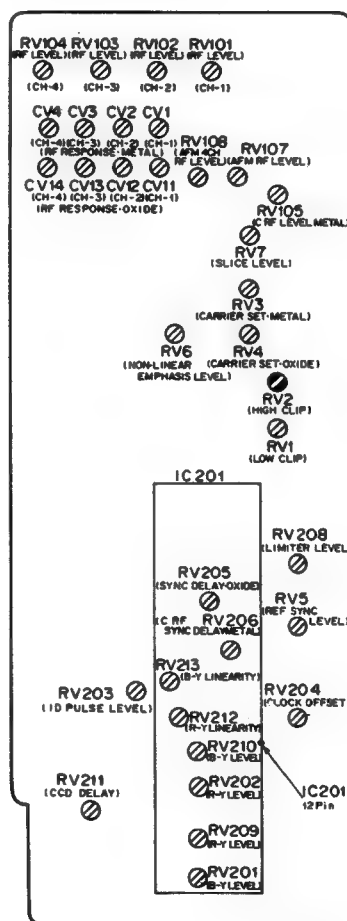
- Input signal: pulse & bar (3T, 2T)
- Insert the BCT-20M and put the unit into the REC mode.
- Extend VDA board using the extension board.
- After level A is measured, set the chroma level to +6dB and adjust level B.
If the chroma level of the Signal Generator can not be +6dB, remove the R-Y, B-Y terminated resistors R8 (82-ohm) and R10 (82-ohm) on the Video Signal Input board (JX-250) temporarily and perform the adjustment.

- Adjustment procedures

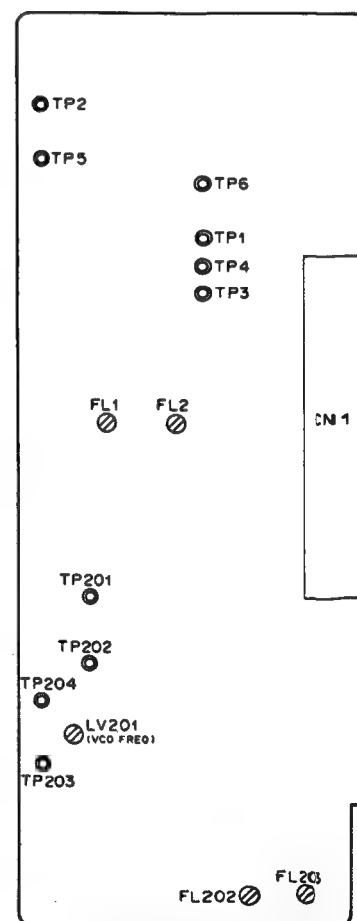
- Test point : TP2;VDA-11/11P
- Adj. point : RV2 (HIGH CLIP)
;VDA-11/11P
- Spec. : A=R-Y/B-Y level
A=100% (reference)
For NTSC : B=305±5%
For PAL : B=285±5%



TRIG : HD/SG



VDA-11/11P BOARD (SOLDERING SIDE)



VDA-11/11P BOARD (COMPONENT SIDE)

8-5-11. C Nonlinear Emphasis Level Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

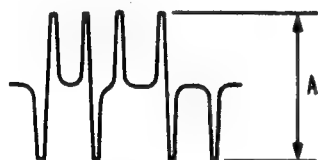
Board: VDA-11/11P board

• Preparation

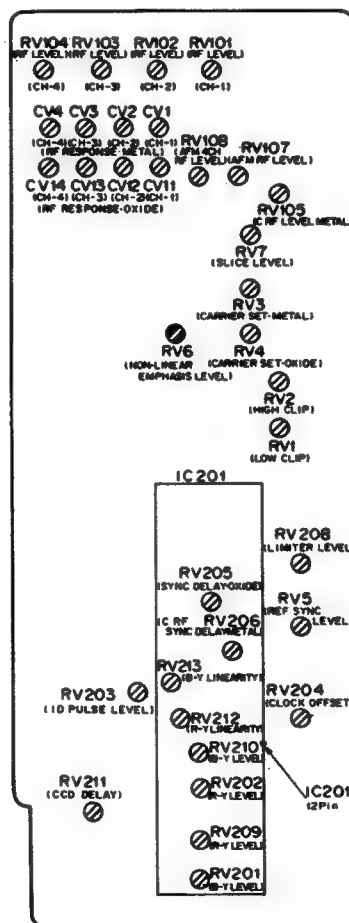
- Input signal: pulse & bar (3T, 2T)
- Insert the BCT-20M and put the unit into the REC mode.
- Extend VDA board using the extension board.

• Adjustment procedures

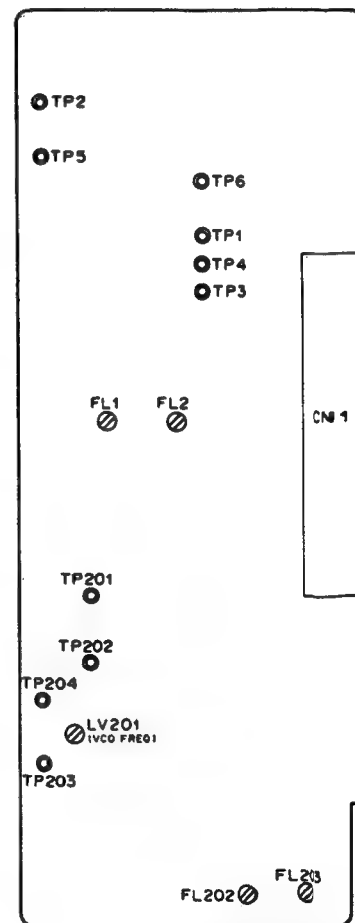
- Test point : TP4;VDA-11/11P
- Adj. point : \odot RV6 (NON-LINEAR EMPHASIS LEVEL);VDA-11/11P
- Spec. : $A=76\pm 2\text{mV}$



TRIG : HD/SG



VDA-11/11P BOARD (SOLDERING SIDE)



VDA-11/11P BOARD (COMPONENT SIDE)

8-5-12. C REC HF Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

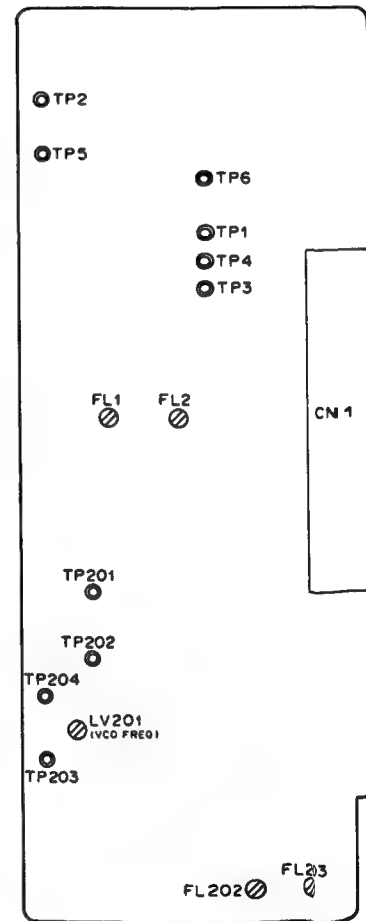
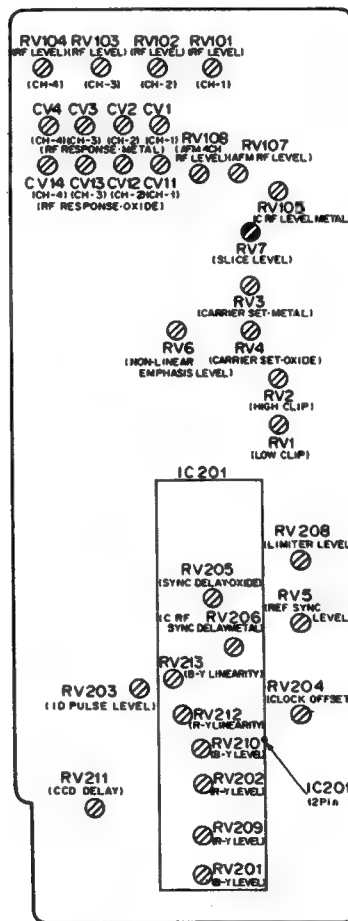
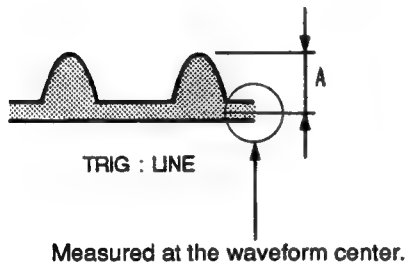
Board: VDA-11/11P board

• Preparation

- Y, B-Y input signal: 0% flat field
- R-Y input signal: H sweep (For only RF, 1Vp-p/75ohms) TP39/Extension board.
- Insert the BCT-20M and put the unit into the REC mode.
- Extend VDA board using the extension board.

• Adjustment procedures

- Test point : TP6;VDA-11/11P
- Adj. point : ●RV7 (SLICE LEVEL);VDA-11/11P
- Spec. : $A=60\pm 2\text{mVp-p}$

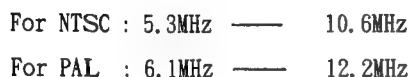


8. VTR SYSTEM ALIGNMENT

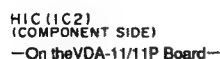
- Preparation

- Input signal: 0% flat field
- Insert the BCT-20M and put the unit into the REC mode.

- Test point : TP5;VDA-11/11P
- Adj. point : RV2 (HIGH CLIP);VDA-11/11P
- Spec. : For NTSC : Minimize the level at 10.6MHz.
(A=40dB or more)
- : For PAL : Minimize the level at 12.2MHz.
(A=40dB or more)



TRIG:INT



8-5-14. Y Input Level Adjustment

• Setting

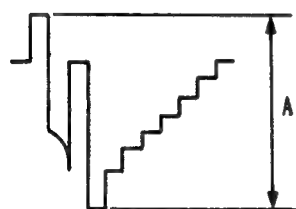
Equipment: Dual Trace Oscilloscope	Board: AFM-6/6P board
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• Preparation

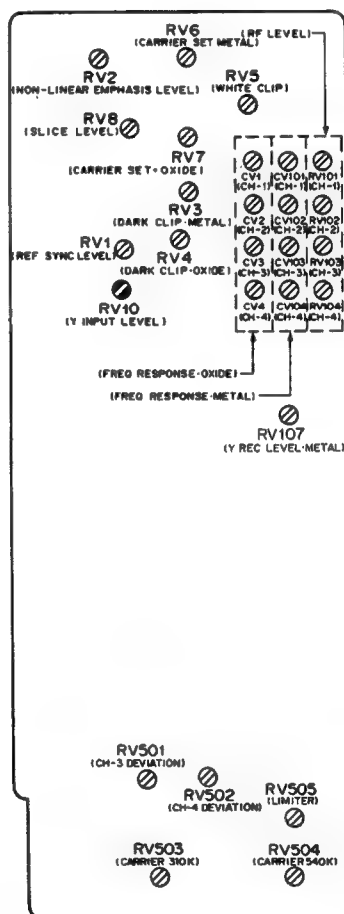
- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

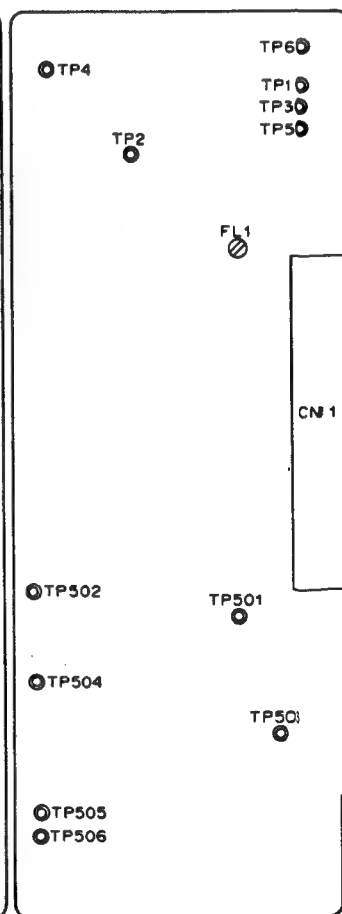
- Test point : TP5;AFM-6/6P
- Adj. point : ●RV10 (Y INPUT LEVEL);AFM-6/6P
- Spec. : $A=1.0\pm0.02V$



TRIG : INT



AFM-6/6P BOARD (SOLDERING SIDE)



AFM-6/6P BOARD (COMPONENT SIDE)

8-5-15. Y REF Sync Level Adjustment

• Setting

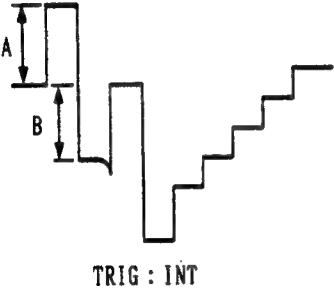
Equipment: Dual Trace Oscilloscope	Board: AFM-6/6P board
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• Preparation

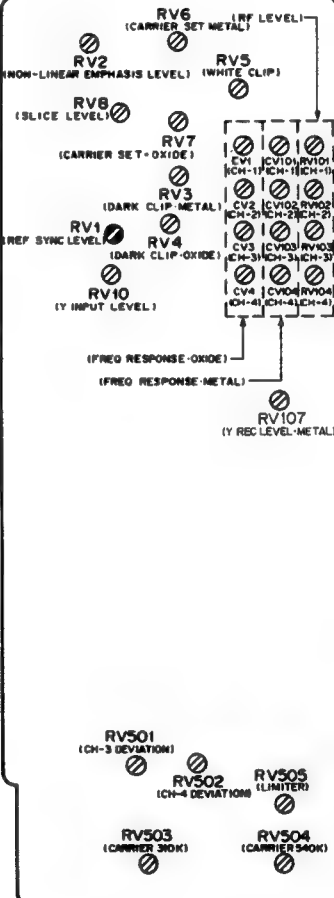
- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

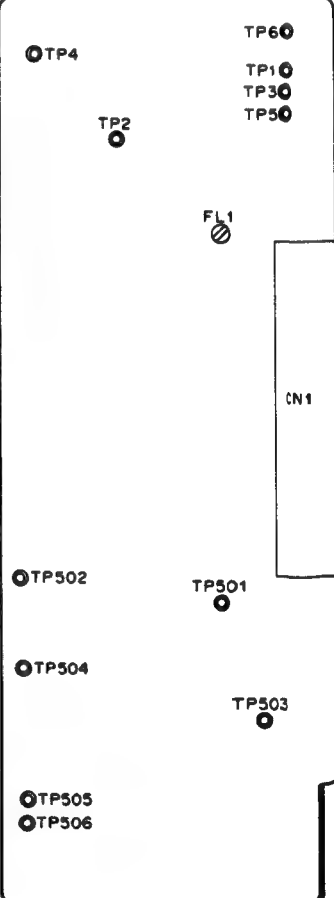
- Test point : TP5;AFM-6/6P
- Adj. point : ●RV1 (REF SYNC LEVEL);AFM-6/6P
- Spec. : A:B=100:125±2.5%



TRIG: INT



AFM-6/6P BOARD (SOLDERING SIDE)



AFM-6/6P BOARD (COMPONENT SIDE)

8-5-16. Y REF Sync Slant Adjustment

• Setting

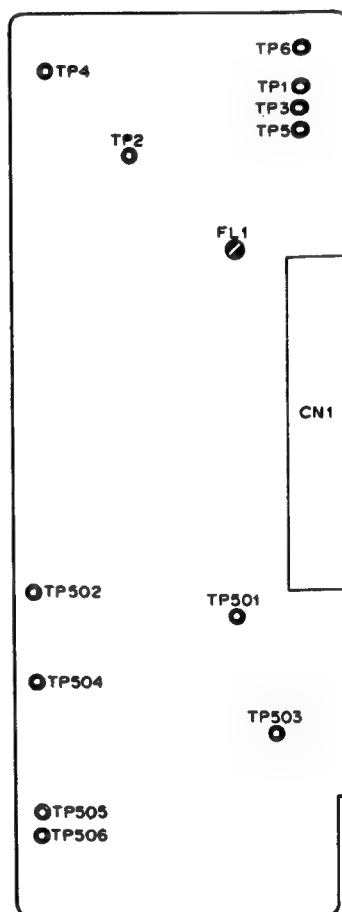
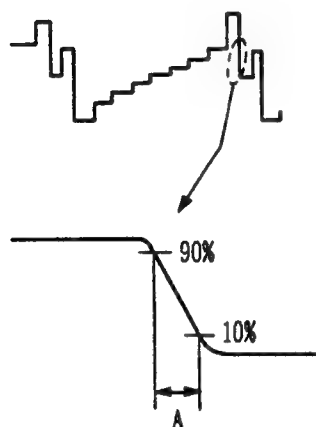
Equipment: Dual Trace Oscilloscope	Board: AFM-6/6P board
------------------------------------	-----------------------

• Preparation

- Built-in-color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP5;AFM-6/6P
- Adj. point : \odot FL1;AFM-6/6P
- Spec. : $A=180\pm 20\text{nsec}$



AFM-6/6P BOARD (COMPONENT SIDE)

8-5-17. Y Carrier/Deviation Adjustment

1) Adjustment using Spectrum Analyzer

Step 1

• Setting

Equipment: Spectrum Analyzer

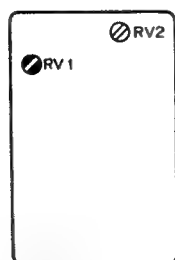
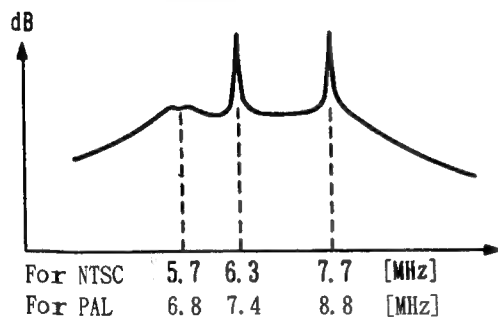
Board: AFM-6/6P board

• Preparation

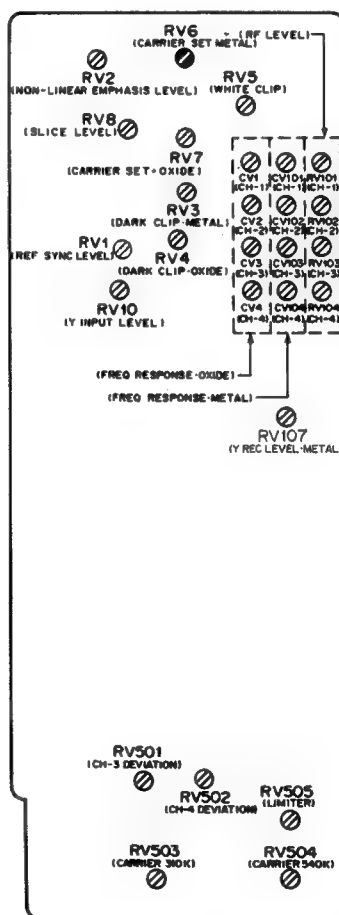
- Input signal: Color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

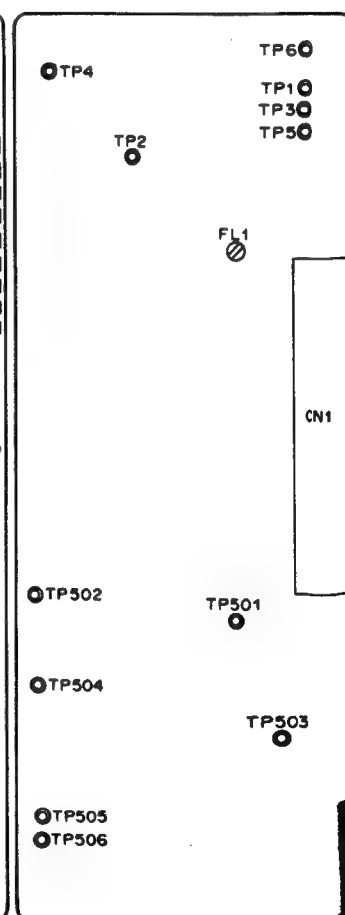
- Test point : TP4;AFM-6/6P
- Adj. point :
 - Sync tip carrier adjustment
 ⦿RV6 (CARRIER SET METAL);AFM-6/6P
 - Deviation adjustment
 ⦿RV1 (IC1)
 ;AFM-6/6P
- Spec. :
 - Sync tip carrier adjustment
 Set the left side peak level as follows.
 For NTSC ... 5.7MHz
 For PAL 6.8MHz
 - Deviation adjustment
 Set the gap between two peaks to 1.4MHz.



HIC (IC1)
 (COMPONENT SIDE)
 —On the AFM-6/6P Board—



AFM-6/6P BOARD (SOLDERING SIDE)



AFM-6/6P BOARD (COMPONENT SIDE)

Step 2.

• Setting

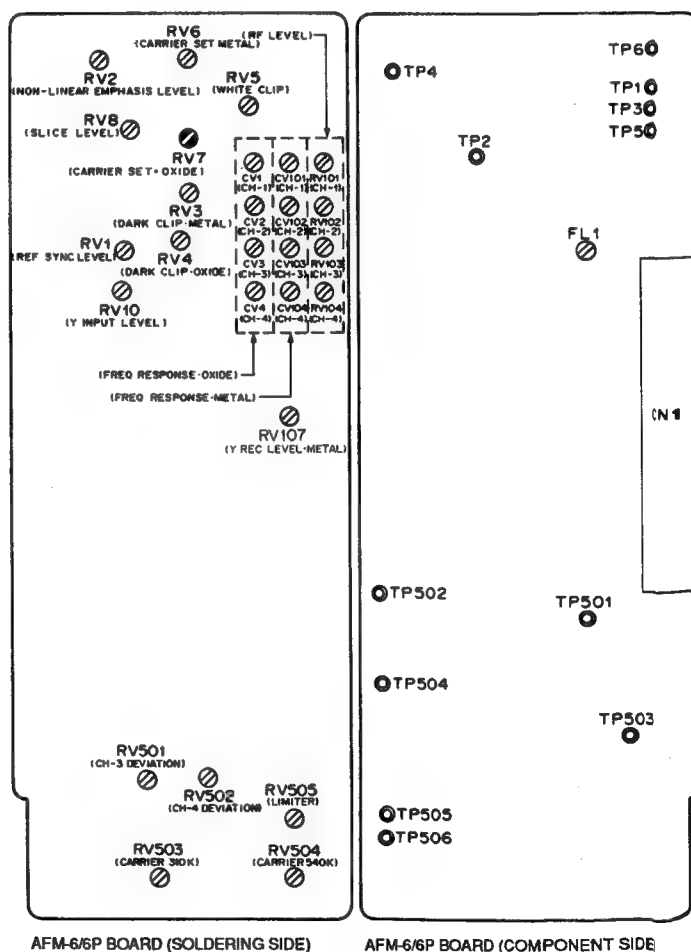
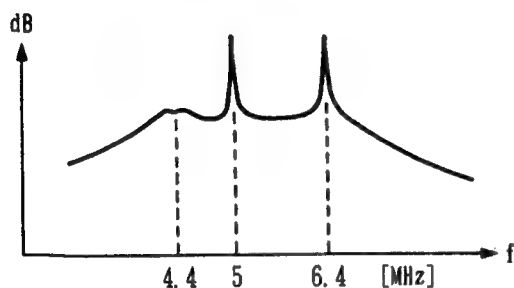
Equipment: Spectrum Analyzer	Board: AFM-6/6P board
------------------------------	-----------------------

• Preparation

- Input signal: Color-bar
- Insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP4;AFM-6/6P
- Adj. point : Sync tip carrier adjustment
 ●RV7 (CARRIER SET OXIDE);AFM-6/6P
- Spec. : Sync tip carrier adjustment
 Set the left side peak level to 4.4MHz.



2) Adjustment Using Deviation Checker

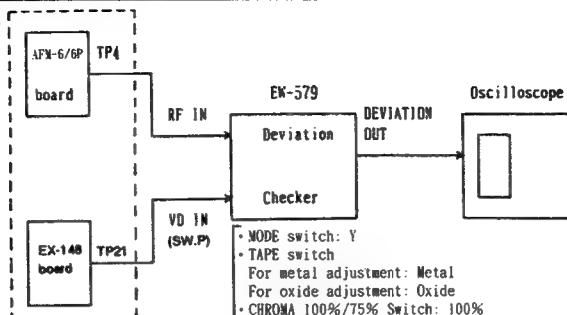
• Setting

Equipment: Dual Trace Oscilloscope

Board: AFM-6/6P board

• Connection

BVW-D600/D600P

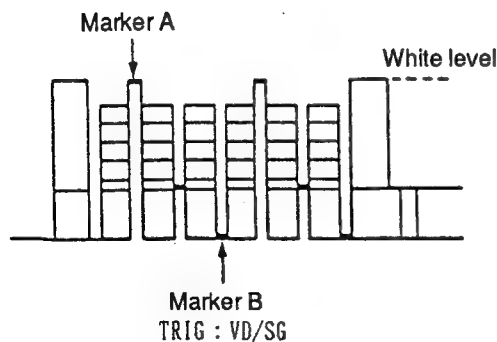


• Preparation

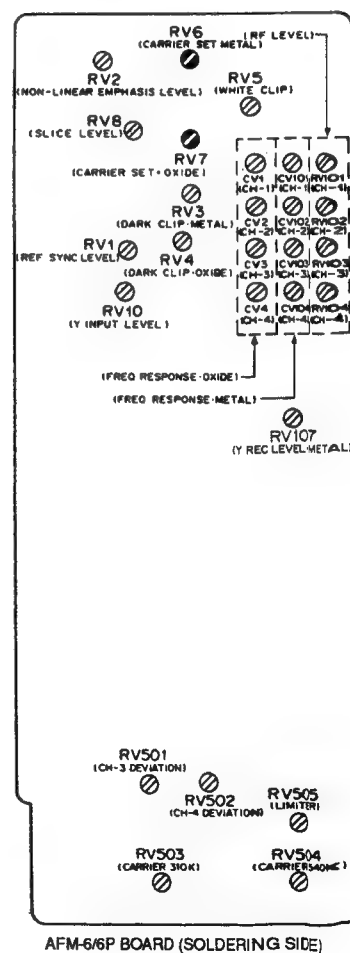
- Built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.
- After metal adjustment is completed, insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

- Test point : DEVIATION OUT (DEVIATION CHECKER)
- Adj. point : • METAL
Marker B adjustment (CARRIER SETTING)
● RV6 (CARRIER SET METAL);AFM-6/6P
Marker A adjustment (DEVIATION)
● RV1 (IC1);AFM-6/6P
- OXIDE
Marker B adjustment (CARRIER SETTING)
● RV7 (CARRIER SET OXIDE);AFM-6/6P
- Spec. : Procedure
1. Set marker B to the sync tip level.
2. Set marker A to the white peak level.
3. Set oxide marker B to the sync tip level.



HIC (IC 1)
(COMPONENT SIDE)
—On the AFM-6/6P Board—



8-5-18. Y Dark Clip Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

Board: AFM-6/6P board

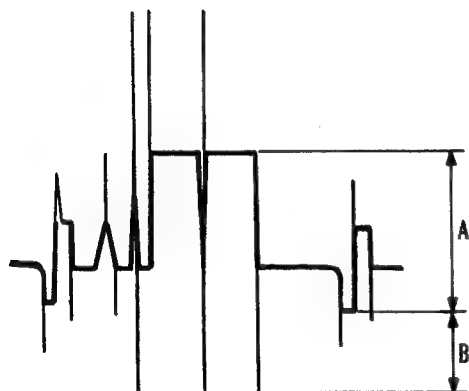
• Preparation

- Input signal: MOD pulse & bar
- Metal: Insert the BCT-20M and put the unit into the REC mode.
- Oxide: Insert the BCT-20G and put the unit into the REC mode.

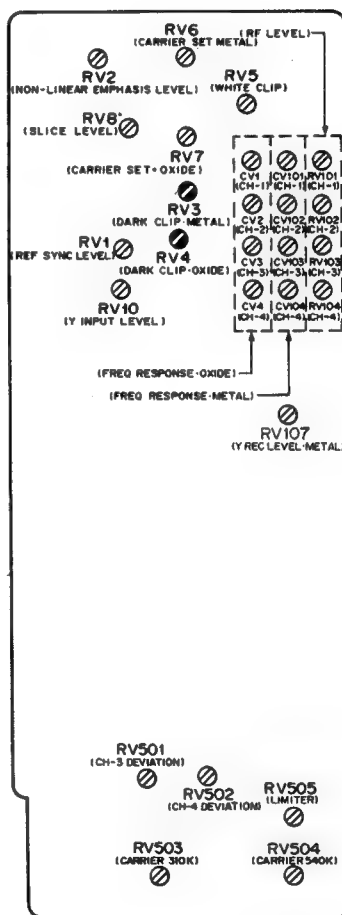
• Adjustment procedures

- Test point : TP2;AFM-6/6P
- Adj. point : ● RV3 (DARK CLIP METAL)
;AFM-6/6P
● RV4 (DARK CLIP OXIDE)
;AFM-6/6P
- Spec. : A = VS level
A = 100% (reference)
For NTSC : B = $100 \pm 2.5\%$ (METAL)
B = $60 \pm 2.5\%$ (OXIDE)

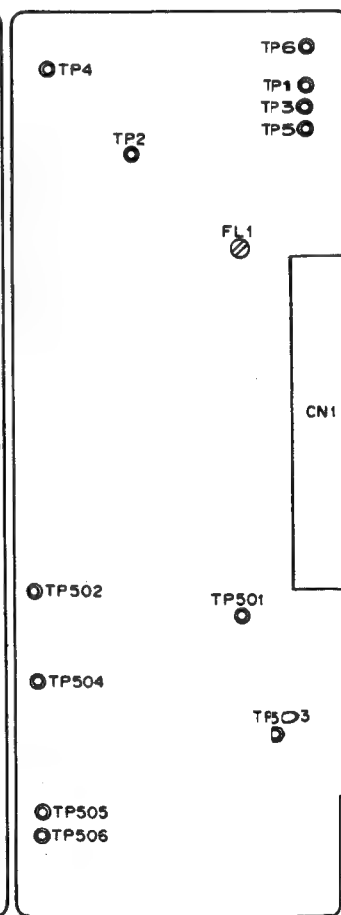
For PAL : B = $150 \pm 2.5\%$ (METAL)
B = $65 \pm 2.5\%$ (OXIDE)



TRIG : HD/SG



AFM-6/6P BOARD (SOLDERING SIDE)



AFM-6/6P BOARD (COMPONENT SIDE)

8-5-19. Y White Clip Adjustment

• Setting

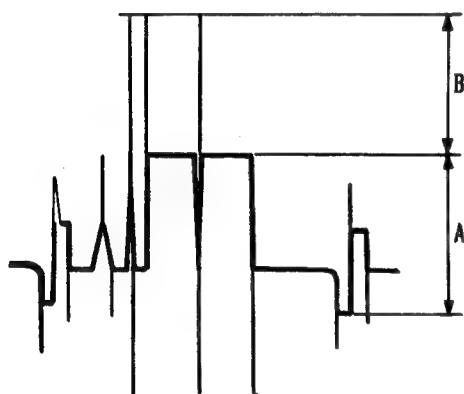
Equipment: Dual Trace Oscilloscope	Board: AFM-6/6P board
------------------------------------	-----------------------

• Preparation

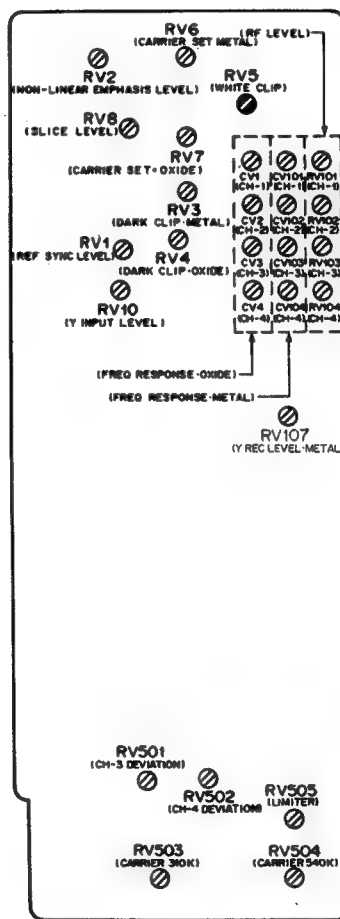
- Input signal: MOD pulse and bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

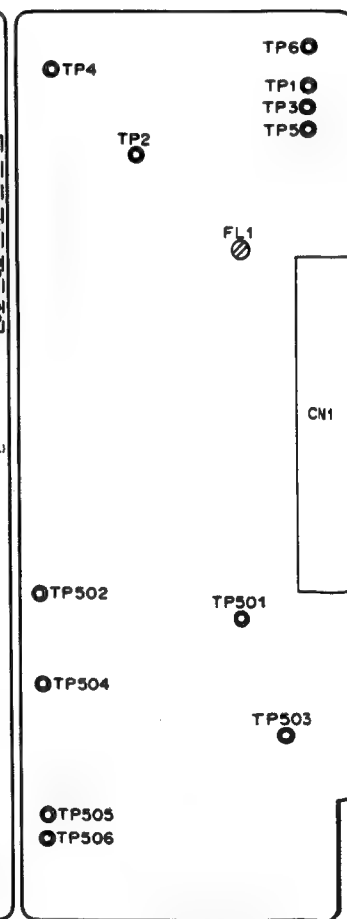
- Test point : TP2;AFM-6/6P
- Adj. point : ● RV5 (WHITE CLIP);AFM-6/6P
- Spec. : A = VS level
A = 100% (reference)
For NTSC : B = $130 \pm 2.5\%$
For PAL : B = $150 \pm 2.5\%$



TRIG : HD/SG



AFM-6/6P BOARD (SOLDERING SIDE)



AFM-6/6P BOARD (COMPONENT SIDE)

8-5-20. Y Nonlinear Emphasis Level Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

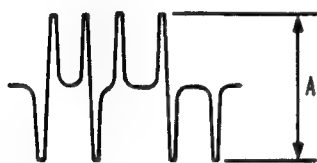
Board: AFM-6/6P board

• Preparation

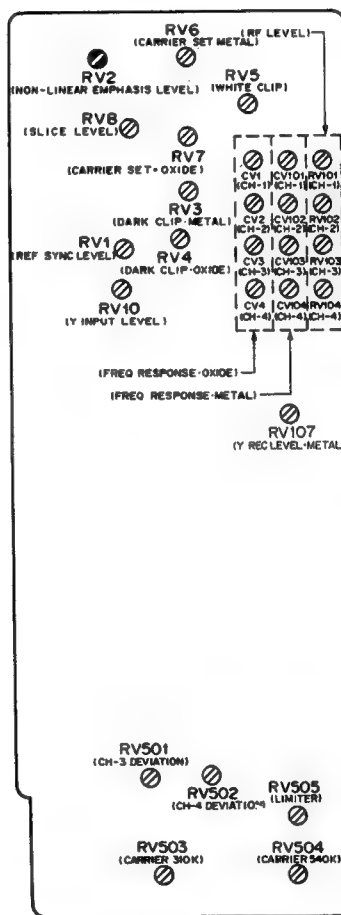
- Input signal: MOD pulse and bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

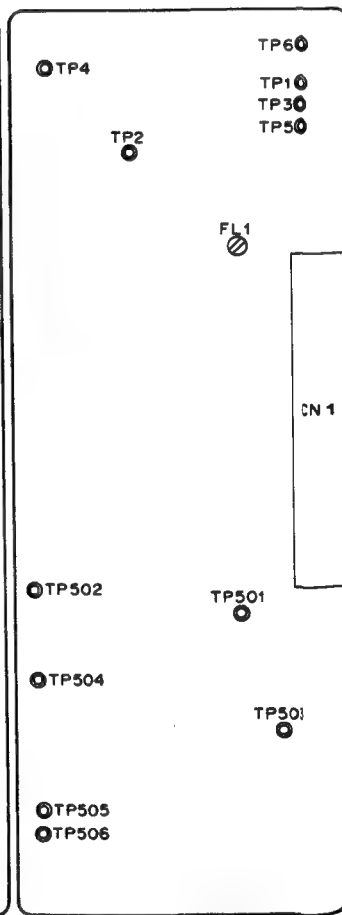
- Test point : TP3;AFM-6/6P
- Adj. point : ● RV2 (NON-LINEAR EMPHASIS);AFM-6/6P
- Spec. : For NTSC : $A = 100 \pm 2\text{mV}$
For PAL : $A = 90 \pm 2\text{mV}$



TRIG : HD/SG



AFM-6/6P BOARD (SOLDERING SIDE)



AFM-6/6P BOARD (COMPONENT SIDE)

8-5-21. Y REC HF Adjustment

• Setting

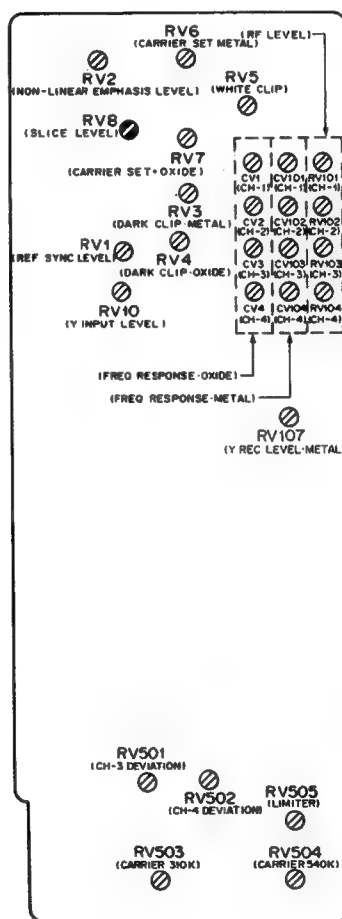
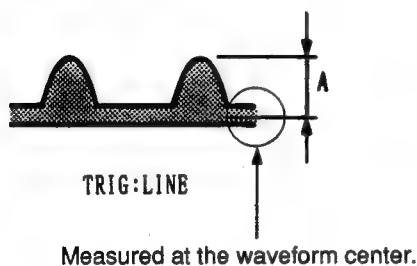
Equipment: Dual Trace Oscilloscope	Board: AFM-6/6P board
------------------------------------	-----------------------

• Preparation

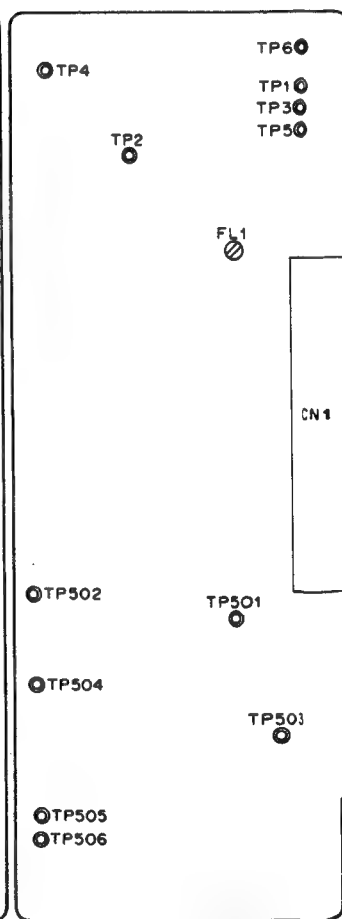
- Y input signal: H sweep {Sweep signal 115IRE (for NTSC) and 820 mV (for PAL) and sync signal 40IRE (for NTSC) and 286 mV (for PAL) with 75-ohms termination}
- TP9/Extension board: AFM-6/6P
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP6;AFM-6/6P
- Adj. point : ● RV8 (SLICE LEVEL);AFM-6/6P
- Spec. : $A = 150 \pm 5\text{mV}$



AFM-6/6P BOARD (SOLDERING SIDE)



AFM-6/6P BOARD (COMPONENT SIDE)

8-5-22. Y MOD Carrier Balance Adjustment

• Setting

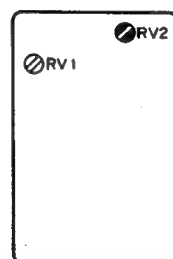
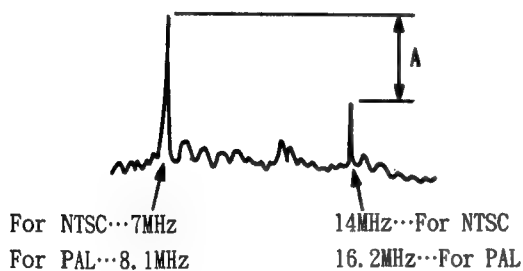
Equipment: Spectrum Analyzer	Board: AFM-6/6P board
------------------------------	-----------------------

• Preparation

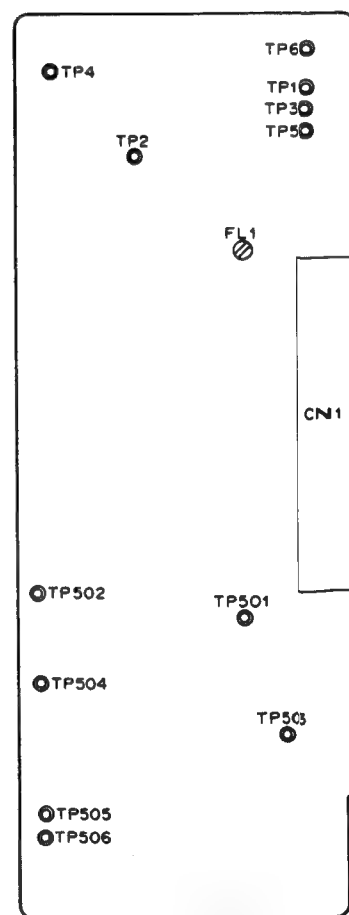
- Input signal: 50% flat field
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP4;AFM-6/6P
- Adj. point : ● RV2 (NON-LINEAR EMPHASIS LEVEL);AFM-6/6P
- Spec. : Minimize the level at 14MHz for NTSC and 16.2MHz for PAL.
(A = 40dB or more)



HIC (IC 1)
(COMPONENT SIDE)
—On the AFM-6/6P Board—



AFM-6/6P BOARD (COMPONENT SIDE)

8-5-23. Y REC Current Tentative Adjustment (Oxide)

• Setting

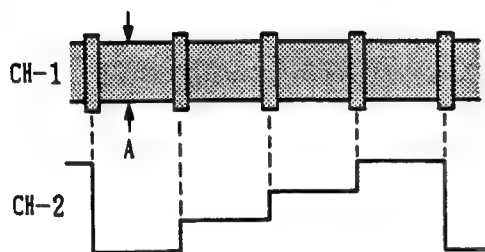
Equipment: Dual Trace Oscilloscope	Board: AFM-6/6P board
------------------------------------	-----------------------

• Preparation

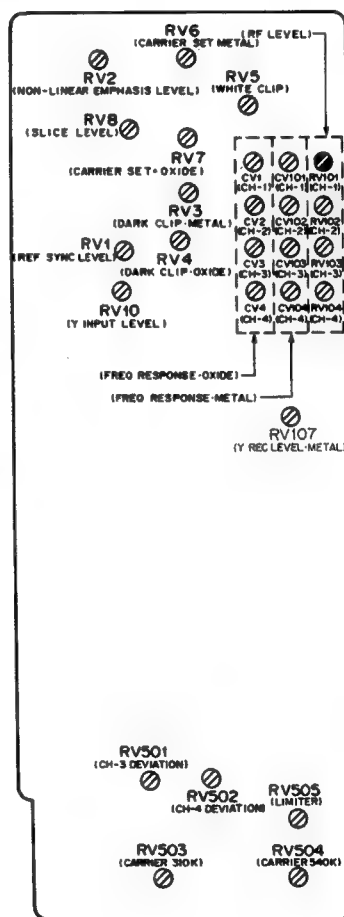
<ul style="list-style-type: none"> • Input signal: 50% flat field • Insert the BCT-20G and put the unit into the REC mode.
--

• Adjustment procedures

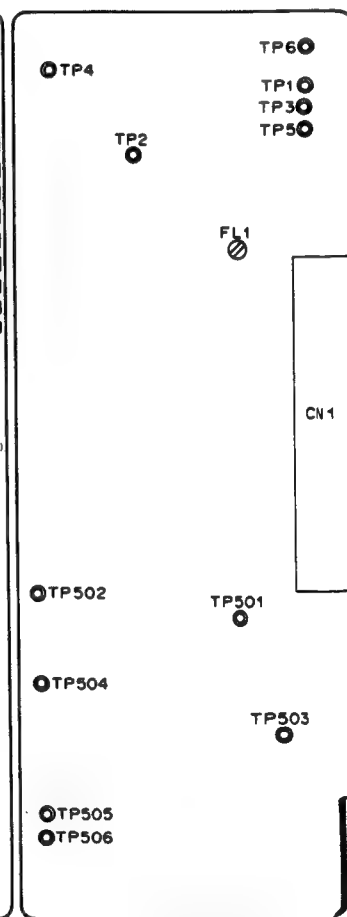
- Test point : CH1: TP32;Extension board (AFM-6/6P)
CH2: TP7;Extension board (AFM-6/6P)
- Adj. point : ● RV101 (CH-1 RF LEVEL);AFM-6/6P
- Spec. : $A = 800 \pm 20\text{mV}$



TRIG : CH-2



AFM-6/6P BOARD (SOLDERING SIDE)



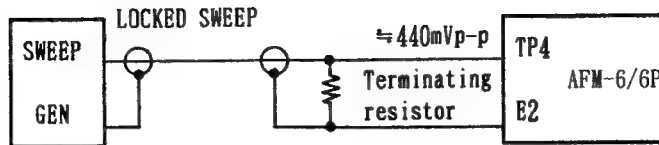
AFM-6/6P BOARD (COMPONENT SIDE)

8-5-24. Y REC Current Frequency Response Adjustment (Oxide)

• Setting

Equipment: Dual Trace Oscilloscope	Board: AFM-6/6P board
------------------------------------	-----------------------

• Connection



• Preparation

- Remove short-housing CNJ2 on the AFM-6/6P board, connect the Sweep Signal Generator between TP4 on the AFM-6/6P board and E2 on the AFM-6/6P board and supply a locked sweep signal.
- Insert the BCT-20G and put the unit into the REC PAUSE mode.
- After adjustment is completed, install short-housing CNJ2.

• Adjustment procedures

- Test point : CH-1 : TP32;Extension board
CH-2 : TP7;Extension board

- TRIG : CH-2

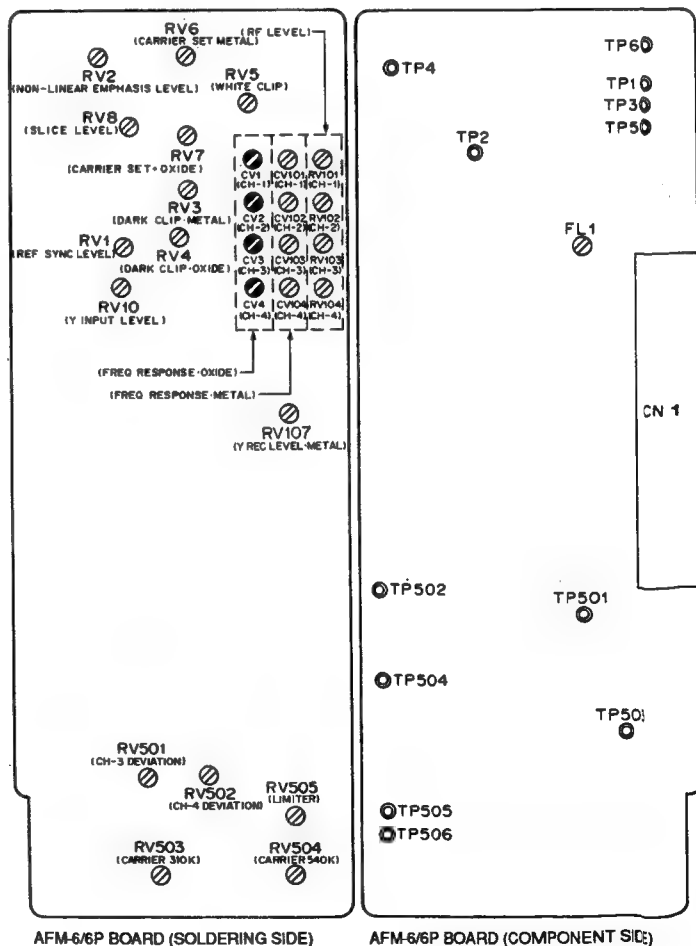
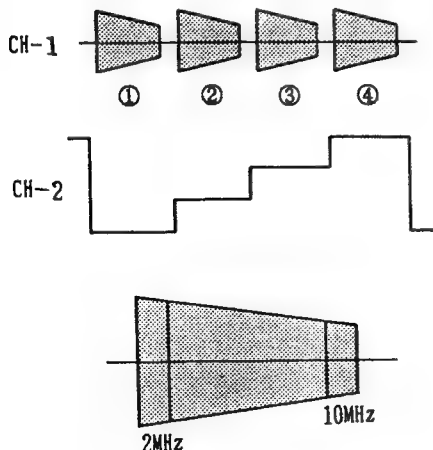
- Adj. point : ① : CV1 (CH-1);AFM-6/6P
② : CV2 (CH-2);AFM-6/6P
③ : CV3 (CH-3);AFM-6/6P
④ : CV4 (CH-4);AFM-6/6P

- Spec. : For NTSC

frequency	level
2 MHz	100% reference
10 MHz	$90 \pm 5\%$

For PAL

frequency	level
2 MHz	100% reference
10 MHz	$90 \pm 10\%$



AFM-6/6P BOARD (SOLDERING SIDE)

AFM-6/6P BOARD (COMPONENT SIDE)

8-5-25. Y REC Current Adjustment (Oxide)

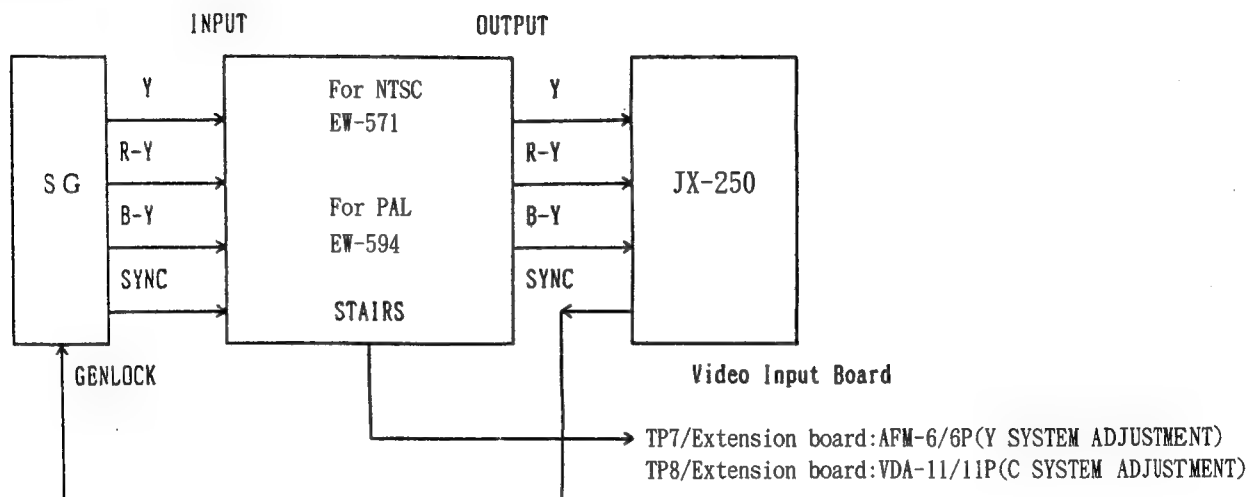
Step 1.

• Setting

Equipment: Dual Trace Oscilloscope	Board: AFM-6/6P board
------------------------------------	-----------------------

• Connection

REC CURRENT ADJ. TOOL

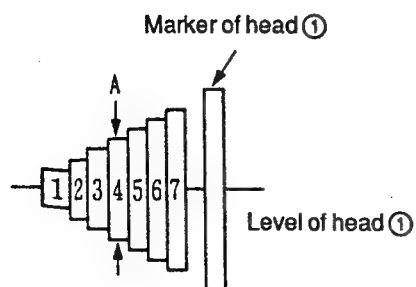


• Preparation

- Remove short-housing CNJ2 on the AFM-6/6P board and connect the RF OUT connector of the REC Current Adjustment Tool between TP4 on the AFM-6/6P board and E2 on the AFM-6/6P board.
- Insert the BCT-20G and put the unit into the REC PAUSE mode.
- Adjustment Tool:
 AUTO/MANU → AUTO
 NTSC/PAL → NTSC (For NTSC) or PAL (For PAL)
 Y/C → Y
 METAL/OXIDE → OXIDE

• Adjustment procedures

- Test point : TP32;Extension board: AFM-6/6P
- Adj. point : RF LEVEL VR/REC CURRENT ADJUSTMENT TOOL
- Spec. : $A = 800 \pm 10\text{mV}$ (Fourth level)



Step 2.

• Setting

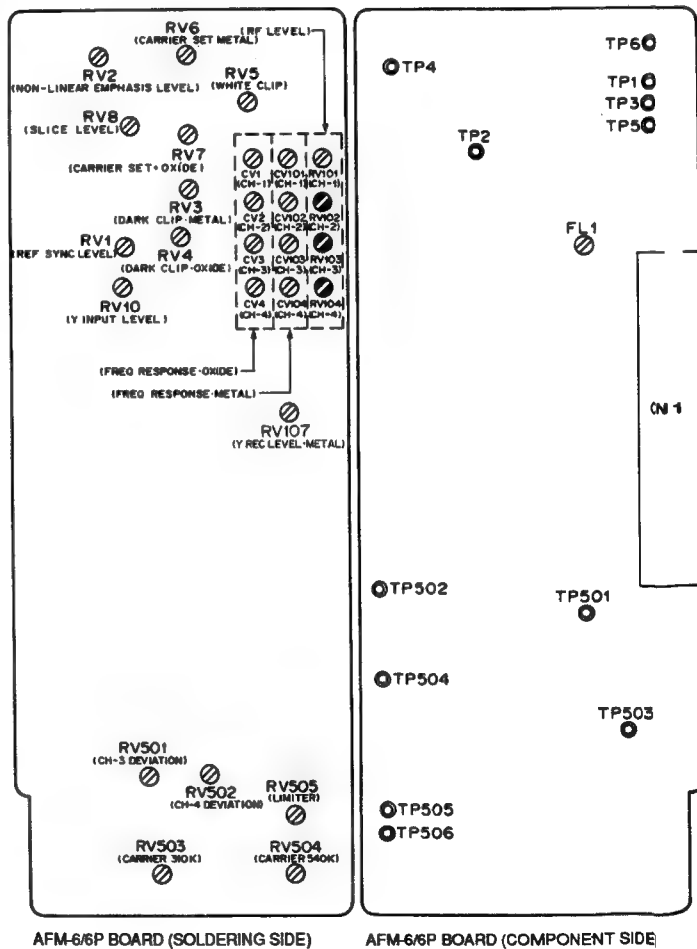
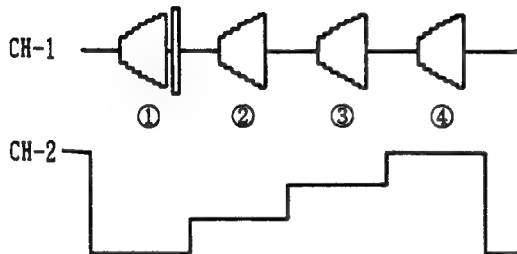
Equipment: Dual Trace Oscilloscope	Board: AFM-6/6P board
------------------------------------	-----------------------

• Preparation

- Remove short-housing CNJ2 on the AFM-6/6P board and connect the RF OUT connector of the REC Current Adjustment Tool between TP4 on the AFM-6/6P board and E2 on the AFM-6/6P board.
- Put the unit into the REC mode and record the signal on the tape.

• Adjustment procedures

- Test point : CH-1 : TP32;Extension board
CH-2 : TP7;Extension board
- Adj. point : HEAD② : ● RV102 (CH-2);AFM-6/6P
HEAD③ : ● RV103 (CH-3);AFM-6/6P
HEAD④ : ● RV104 (CH-4);AFM-6/6P
- Spec. :
- Adjust so that the specified level is the same as in Step 1.



Step 3

• Setting

Equipment: Dual Trace Oscilloscope	Board: VP-24/24P board
------------------------------------	------------------------

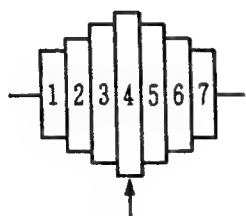
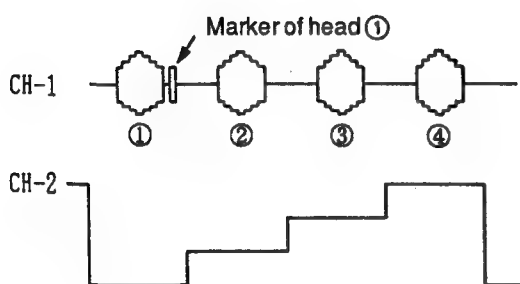
• Preparation

- Remove short-housing CNJ2 on the AFM-6/6P board and connect the RF OUT connector of the REC Current Adjustment Tool between TP4 on the AFM board and E2 on the AFM-6/6P board.

• Adjustment procedures

- Test point : CH-1 : TP33; Extension board : VP-24/24P
CH-2 : TP25; Extension board : VP-24/24P

- Spec :



Check the maximum PB RF level.
* The illustrated fourth level is maximum.

1. Play back the recorded portion in step 2.
2. Memorize the maximum level for every four heads (① through ④).

Step 4.

• Setting

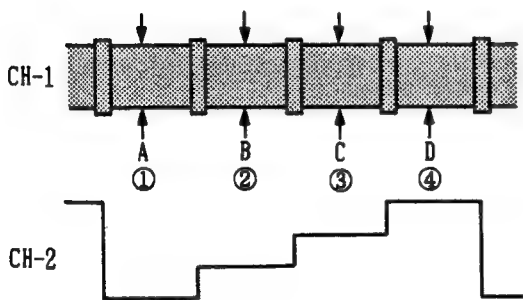
Equipment: Dual Trace Oscilloscope	Board: AFM-6/6P board
------------------------------------	-----------------------

• Preparation

- Remove short-housing CNJ2 on the AFM-6/6P board and connect the RF OUT connector of the REC Current Adjustment Tool between TP4 on the AFM-6/6P board and E2 on the AFM-6/6P board.
- Input signal: 50% flat field
- Insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

- Test point : CH-1 : TP32;Extension board
CH-2 : TP7;Extension board
- Adj. point : HEAD① : ● RV101 (CH-1);AFM-6/6P
HEAD② : ● RV102 (CH-2);AFM-6/6P
HEAD③ : ● RV103 (CH-3);AFM-6/6P
HEAD④ : ● RV104 (CH-4);AFM-6/6P
- Spec. : Adjust the voltage so that A, B, C, and D correspond to the maximum levels memorized in Step 3.



For NTSC

[Correspondence Table]

1	2	3	4	5	6	7
630	690	750	800	865	930	980

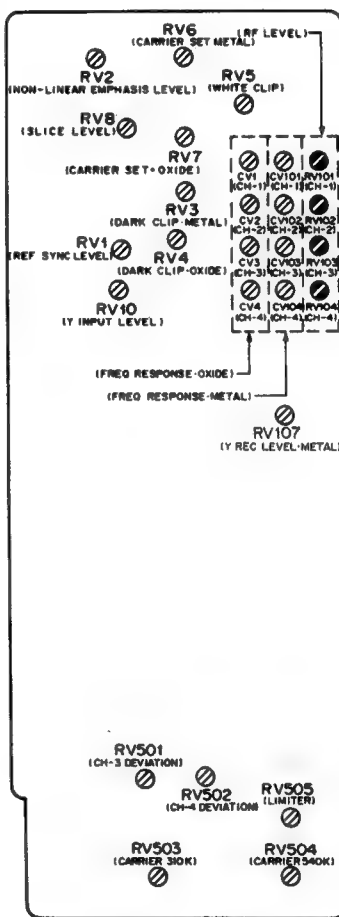
(mVp-p)

For PAL

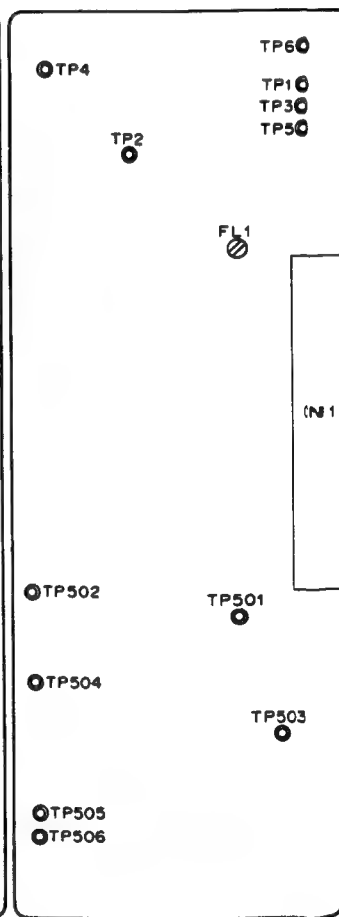
[Correspondence Table]

1	2	3	4	5	6	7
630	690	750	800	865	930	980

(mVp-p)



AFM-6/6P BOARD (SOLDERING SIDE)



AFM-6/6P BOARD (COMPONENT SIDE)

8-5-26. Y Frequency Response Check (Oxide)

• Setting

Equipment: Waveform Monitor	Board:
-----------------------------	--------

• Preparation

- Calculate the calibration value on the standard player (equivalent to BVW-75/75P).

Calibration Value = (Chart 1) - (CR5-2A playback level For NTSC)
(CR5-2APS playback level... For PAL)

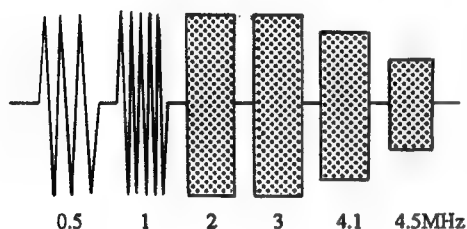
- Input signal: Multi burst signal
- Insert the blank tape (BCT-20G) to BVW-D600/D600P.
- Then put the unit into the REC mode about 120 seconds.

	NTSC	PAL
1 MHz	100%	100%
2 MHz	97%	100%
3 MHz	92%	100%
4.1 MHz	86%	70%

Chart 1

• Adjustment procedures

CAV Y OUT/BVW-75/75P (or equivalent)



Specification

	NTSC	PAL
frequency	level	level
0.5 MHz	100% (REFERENCE)	100% (REFERENCE)
1 MHz	(100-Calibration value) $\pm 5\%$	(100-Calibration value) $\pm 5\%$
2 MHz	(100-Calibration value) $^{+5}_{-7.5}\%$	(98-Calibration value) $^{+5}_{-7.5}\%$
3 MHz	(95-Calibration value) $^{+7.5}_{-10}\%$	(90-Calibration value) $^{+5}_{-10}\%$
4.1 MHz	(85-Calibration value) $^{+10}_{-15}\%$	(73-Calibration value) $^{+5}_{-18}\%$

Measure the levels at the center of moire.

The level differences between the fields at 3 MHz should be within 5% respectively.

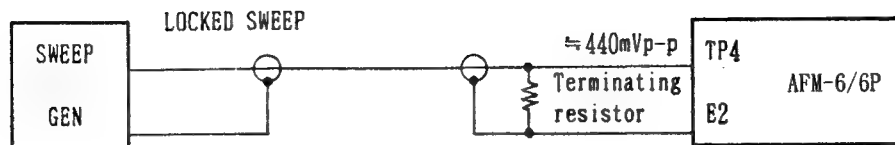
Repeat 8-5-24. Y REC current frequency response adjustment (Oxide) and 8-5-25. Y REC current adjustment (Oxide) so that the specification is met.

8-5-27. Y REC Current Frequency Response Adjustment (Metal)

• Setting

Equipment: Dual Trace Oscilloscope	Board: AFM-6/6P board
------------------------------------	-----------------------

• Connection



• Preparation

- Remove short-housing CNJ2 on the AFM-6/6P board, connect the Sweep Signal Generator between TP4 on the AFM-6/6P board and E2 on the AFM-6/6P board, and supply a locked sweep signal.
- Insert the BCT-20M and put the unit into the REC mode.
- After adjustment is completed, install short-housing CNJ2.

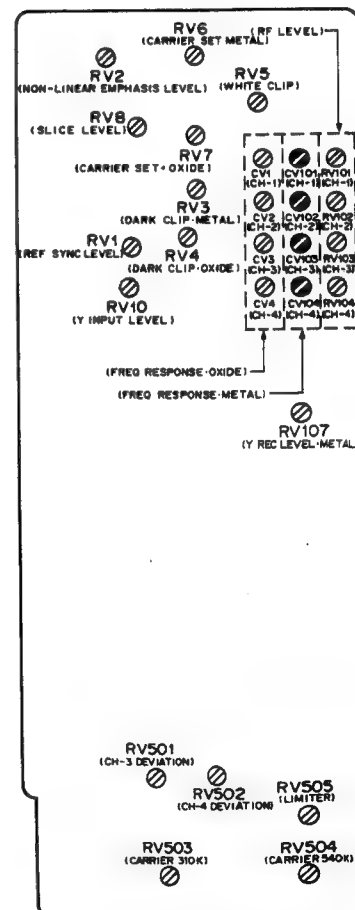
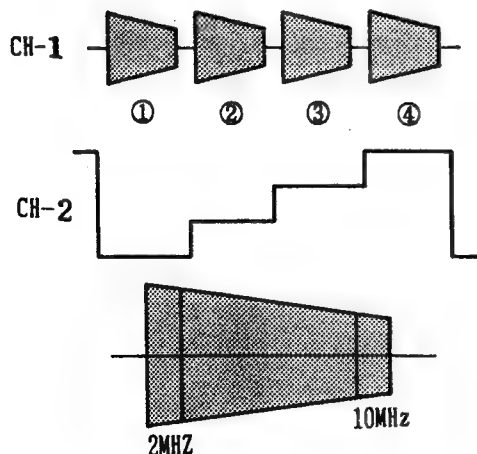
• Adjustment procedures

- Test point : CH-1 : TP32;Extension board
CH-2 : TP7;Extension board
- TRIG : CH-2
- Adj. point : ① ● CV101 (CH-1);AFM-6/6P
② ● CV102 (CH-2);AFM-6/6P
③ ● CV103 (CH-3);AFM-6/6P
④ ● CV104 (CH-4);AFM-6/6P
- Spec. : For NTSC

frequency	level
2 MHz	100% reference
10 MHz	85 \pm 5 %

: For PAL

frequency	level
2 MHz	100% reference
10 MHz	95 \pm 5 %



AFM-6/6P BOARD (SOLDERING SIDE)

8-5-28. Y REC Current Adjustment (Metal)

• Setting

Equipment: Dual Trace Oscilloscope

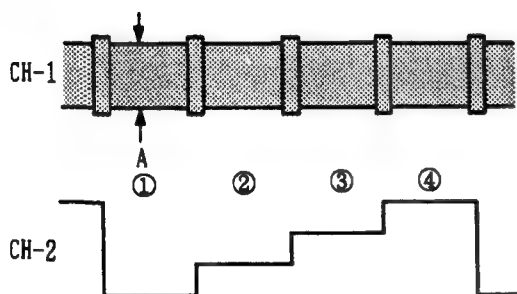
Board: AFM-6/6P board

• Preparation

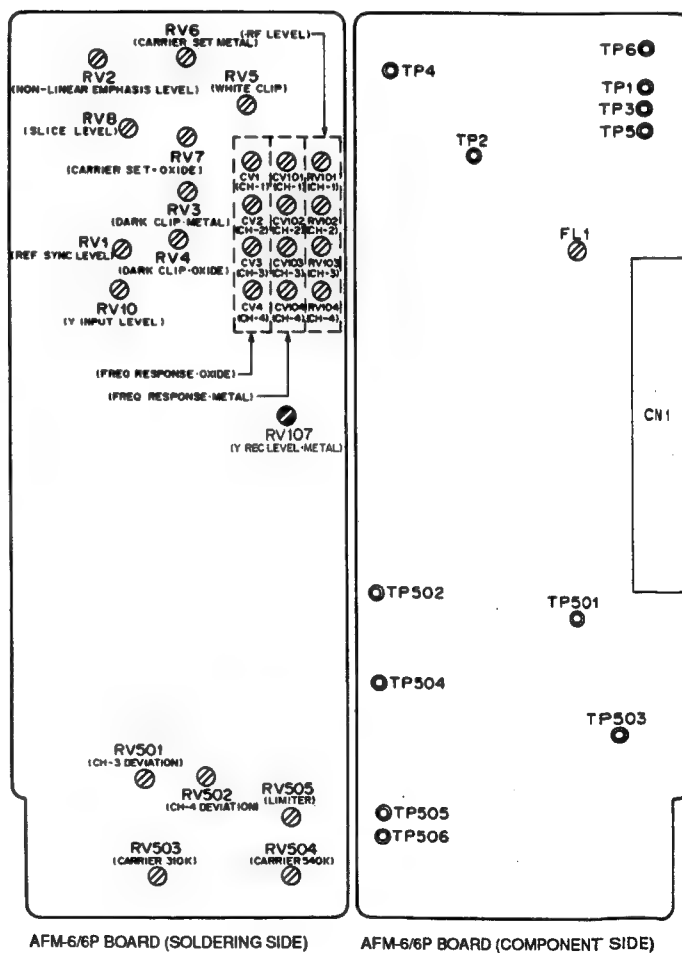
- Input signal: 50% flat field
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : CH-1 : TP32;Extension board
CH-2 : TP7;Extension board
- Adj. point : ● RV107 (Y REC LEVEL METAL);AFM-6/6P
- Spec. : Adjust so that A is two times as high as the level of head ① which is set in Step 4 of Sec. 8-5-25. Y REC Current Adjustment (Oxide).



Note: Make sure that the level ① through ④ are not exceed 1.6V respectively.



8-5-29. Y Frequency Response Check (Metal)

• Setting

Equipment: Waveform Monitor	Board:
-----------------------------	--------

- Calculate the calibration value on the standard player (equivalent to BVW-75/75P).

Calibration Value = (Chart 1) - (CR5-1B playback level..... For NTSC)
(CR5-1BPS playback level... For PAL)

- Input signal: Multi burst signal
- Insert the blank tape (BCT-20M) to BVW-D600/D600P. Then put the unit into the REC mode about 120 seconds.

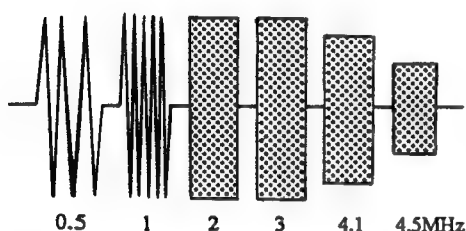
NTSC		PAL	
1 MHz	100%	1 MHz	100%
2 MHz	100%	2 MHz	100%
3 MHz	100%	4 MHz	100%
4.1 MHz	100%	5 MHz	100%
4.5 MHz	86%	5.5 MHz	80%

Chart 1

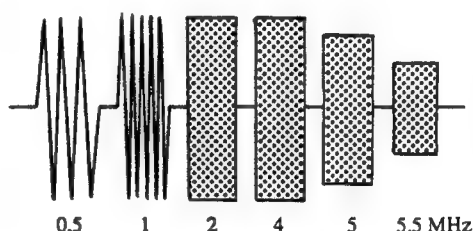
• Adjustment procedures

CAV Y OUT/BVW-75/75P (or equivalent)

(For NTSC)



(For PAL)



Specification (For NTSC)

frequency	level
0.5 MHz	100% (REFERENCE)
1 MHz	(100-Calibration value) $\pm 5\%$
2 MHz	(100-Calibration value) $\pm 5\%$
3 MHz	(100-Calibration value) $\pm 2.5\%$
4.1 MHz	(95-Calibration value) $\pm 5\%$
4.5 MHz	(80-Calibration value) $\pm 10\%$

Specification (For PAL)

frequency	level
0.5 MHz	100% (REFERENCE)
1 MHz	(100-Calibration value) $\pm 5\%$
2 MHz	(100-Calibration value) $\pm 5\%$
4 MHz	(100-Calibration value) $\pm 2.5\%$
5 MHz	(100-Calibration value) $\pm 5\%$
5.5 MHz	(85-Calibration value) $\pm 10\%$

Measure the levels at the center of moire.

For NTSC

- The level differences between the fields at 4.1 MHz should be within 5% respectively.

For PAL

- The level differences between the fields at 5 MHz should be within 5% respectively.

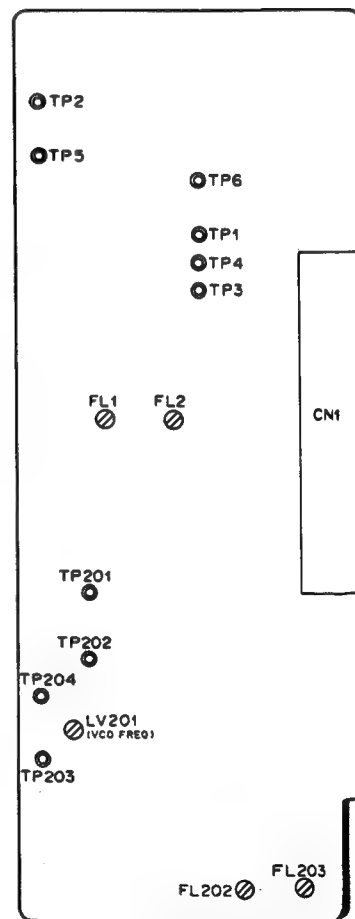
Repeat 8-5-27. Y REC current frequency response adjustment (METAL) and 8-5-28. Y REC current adjustment (METAL) so that the specification is met.

8. VTR SYSTEM ALIGNMENT

- Preparation

- Adjustment procedures

-



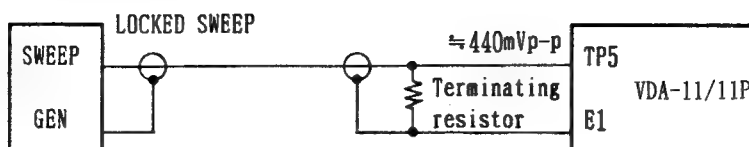
VDA-11/11P BOARD (COMPONENT SIDE)

8-5-31. C REC Current Frequency Response Adjustment (Oxide)

- Setting

Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
------------------------------------	-------------------------

- Connection



- Preparation

- Remove short-housing CNJ2 on the VDA-11/11P board, connect the Sweep Signal Generator between TP5 on the VDA-11/11P board and E1 on the VDA-11/11P board, and supply a locked sweep
- Insert the BCT-20G and put the unit into the REC PAUSE mode.

- Adjustment procedures

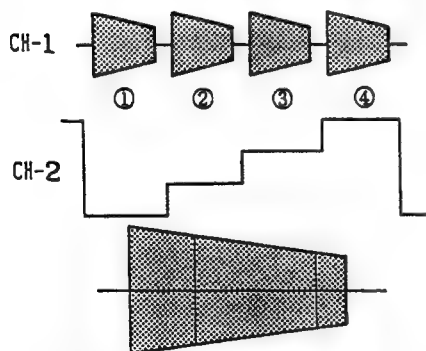
- Test point : CH-1 : TP46/Extension board
CH-2 : TP8/Extension board
- TRIG : CH-2
- Adj. point : CH-1 : ● CV1 (CH-1);VDA-11/11P
CH-2 : ● CV2 (CH-2);VDA-11/11P
CH-3 : ● CV3 (CH-3);VDA-11/11P
CH-4 : ● CV4 (CH-4);VDA-11/11P

- Spec. : For NTSC

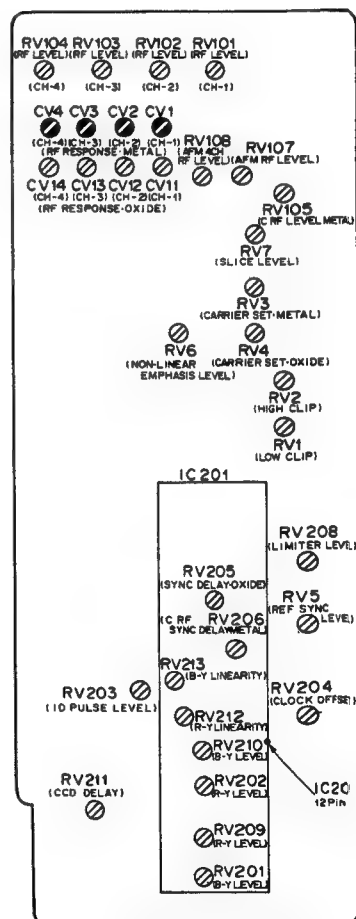
frequency	level
4.08 MHz	100% reference
10 MHz	50±10%

- : For PAL

frequency	level
3.93 MHz	100% reference
10 MHz	60±10%



For NTSC ... 4.08MHz	10MHz ... For NTSC
For PAL ... 3.93MHz	10MHz ... For PAL



VDA-11/11P BOARD (SOLDERING SIDE)

- **Note**

- After adjustment is completed, install short-housing CNJ2.

8-5-32. C REC Current Adjustment (Oxide)

Step 1.

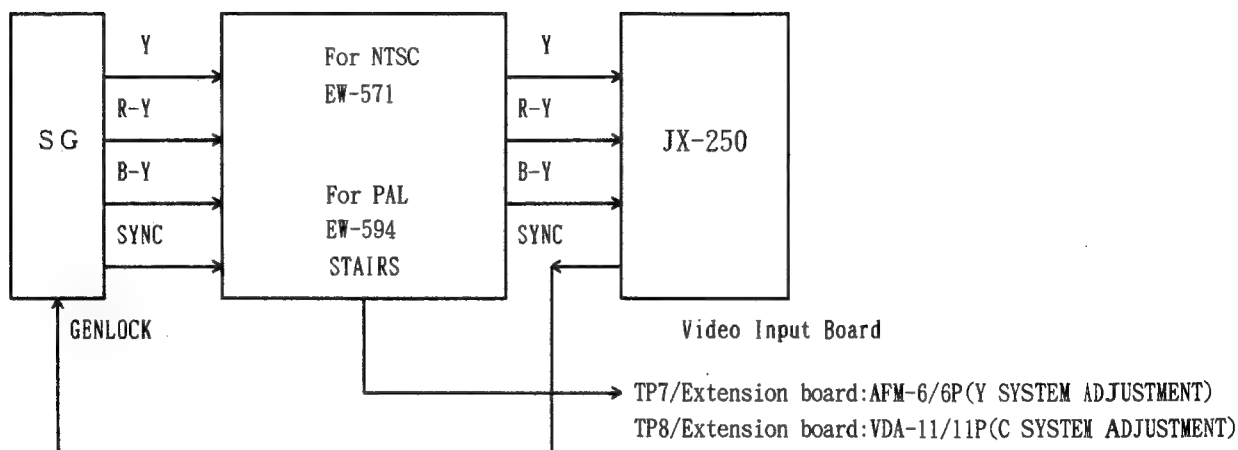
• Setting

Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
------------------------------------	-------------------------

• Connection

REC CURRENT ADJ. TOOL INPUT

OUTPUT

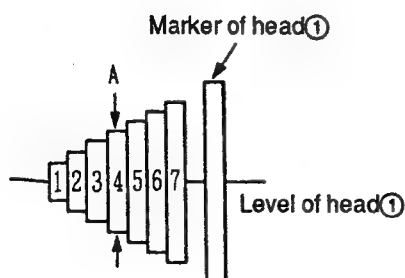


• Preparation

- Remove short-housing CNJ2 on the VDA-11/11P board and connect the RF OUT connector of the REC Current Adjustment Tool between TP5 on the VDA-11/11P board and E1 on the VDA-11/11P board.
- Insert the BCT-20G and put the unit into the REC PAUSE mode.
- Adjustment tool:
 AUTO/MANU→AUTO
 NTSC/PAL→NTSC (For NTSC) or PAL (For PAL)
 Y/C→C
 METAL/OXIDE→OXIDE

• Adjustment procedures

- Test point : TP46;Extension board
- Adj. point : RF LEVEL VR/REC
Current Adjustment Tool
- Spec. : A = 400 ± 10 mV
(Fourth level)

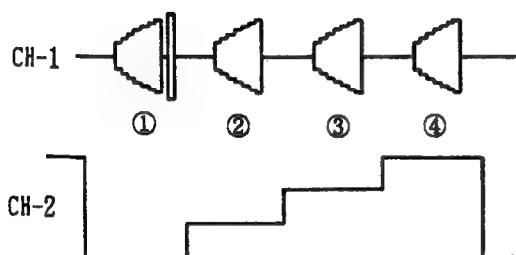


- Setting

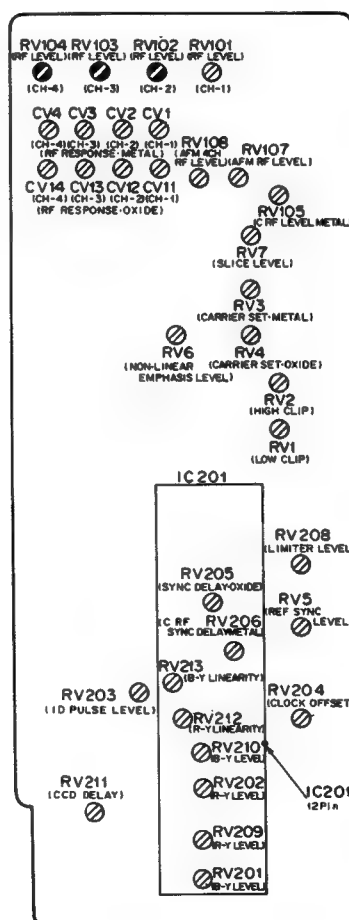
Board: VDA-11/11P board

- Remove short-housing CNJ2 on the VDA-11/11P board and connect the RF OUT connector of the REC Current Adjustment Tool between TP5 on the VDA-11/11P board and E1 on the VDA-11/11P board.

- Adjust so that the specified level is the same as in Step 1.
- Test point : CH-1 : TP46;Extension board
CH-2 : TP8;Extension board
- Adj. point : HEAD ② : ● RV102 (CH-2);VDA-11/11P
HEAD ③ : ● RV103 (CH-3);VDA-11/11P
HEAD ④ : ● RV104 (CH-4);VDA-11/11P



- After adjustment is completed, put the unit into the REC mode and record the signal in the tape.



The diagram shows the following components and their locations:

- TP2**: Located at the top left.
- TP5**: Located below TP2.
- TP6**, **TP1**, **TP4**, **TP3**: A vertical column of four test points on the right side.
- FL1**, **FL2**: Two circular components with diagonal hatching, located below TP5.
- CN1**: A large rectangular connector symbol on the far right.
- TP201**, **TP202**, **TP204**: Three small circles arranged vertically on the lower left.
- LV201 (VCO FREQ)**: A circular component with diagonal hatching, located between TP202 and TP203.
- TP203**: A small circle located below LV201.
- FL202**, **FL203**: Two circular components with diagonal hatching at the bottom right.

VDA-11/11P BOARD (COMPONENT SIDE)

Step 3.

• Setting

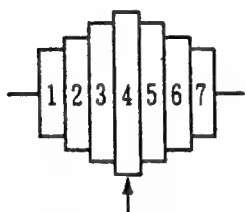
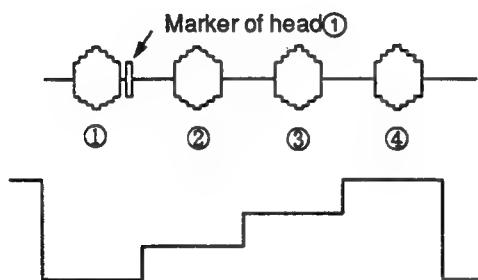
Equipment: Dual Trace Oscilloscope	Board: VP-24/24P board
------------------------------------	------------------------

• Preparation

- Remove short-housing CNJ2 on the VDA-11/11P board and connect the RF OUT connector of the REC Current Adjustment Tool between TP5 on the VDA-11/11P board and E1 on the VDA-11/11P board.

• Adjustment procedures

- Test point : CH-1 : TP31; Extension board: VP-24/24P
CH-2 : TP25; Extension board: VP-24/24P
- Spec. :



Check the maximum PB RF level.

* The illustrated fourth level is maximum.

1. Play back the recorded portion in Step 2.
2. Memorize the maximum level for every four heads (① through ④)
3. After adjustment is completed, install short-housing CNJ2.

- Setting

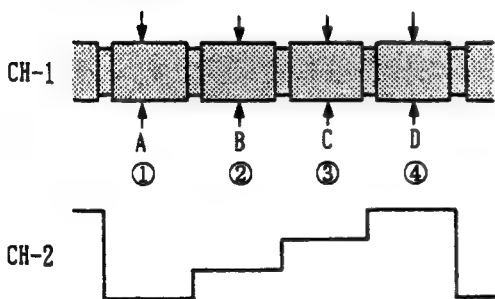
Board: VDA-11/11P board

- Preparation

- Remove short-housing CNJ2 on the VDA-11/11P board and connect the RF OUT connector of the REC Current Adjustment Tool between TP5 on the VDA-11/11P board and E1 on the VDA-11/11P board.
- Input signal: 0% flat field
- Insert the BCT-20G and put the unit into the REC mode.

- Adjustment procedures

- Test point : CH-1 : TP46;Extension board
CH-2 : TP8;Extension board
- Adj. point : HEAD① : ● RV101 (CH-1)
;VDA-11/11P
HEAD② : ● RV102 (CH-2)
;VDA-11/11P
HEAD③ : ● RV103 (CH-3)
;VDA-11/11P
HEAD④ : ● RV104 (CH-4)
;VDA-11/11P
- Spec. : Adjust the voltage so that A,B,
C, and D correspond to the
maximum levels memorized in
Step 3.



[Correspondence Table]

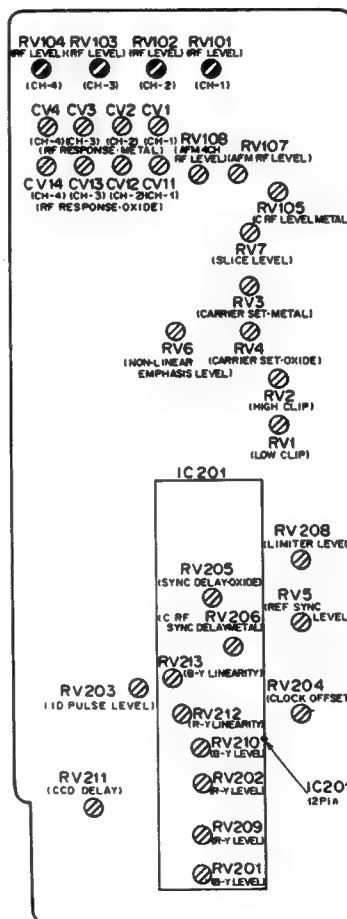
1	2	3	4	5	6	7
310	340	370	400	430	475	500

(mVp-p)

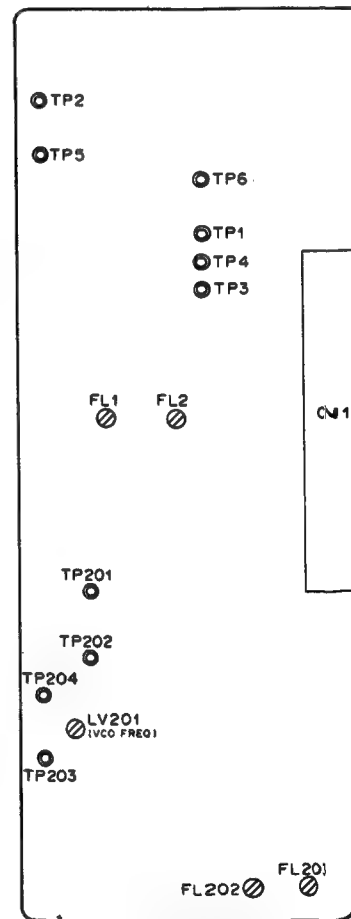
[Correspondence Table]

1	2	3	4	5	6	7
310	340	370	400	430	475	500

(mVp-p)



VDA-11/11P BOARD (SOLDERING SIDE)



VDA-11/11P BOARD (COMPONENT SIDE)

8-5-33. C Frequency Response Check (Oxide)

• Setting

Equipment: Waveform Monitor	Board:
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• Preparation

- Calculate the calibration value on the standard player (equivalent to BVW-75/75P).
Calibration Value = (Chart 1) - (CR5-2A playback level For NTSC)
(CR5-2APS playback level For PAL)
- Input signal: Multi burst signal
- Insert the blank tape (BCT-20G) to BVW-D600/D600P. Then put the unit into REC mode about 90 seconds.

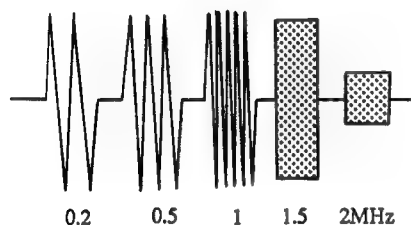
	NTSC	PAL
0.5 MHz	100%	100%
1 MHz	97%	100%
1.5 MHz	86%	85%

Chart 1

• Adjustment procedures

CAV R-Y OUT/BVW-75/75P (or equivalent)

CAV B-Y OUT/BVW-75/75P (or equivalent)



Specification

	NTSC	PAL
frequency	level	level
0.2 MHz	100% (REFERENCE)	100% (REFERENCE)
0.5 MHz	(100-Calibration value) $\pm 5\%$	(100-Calibration value) $\pm 5\%$
1 MHz	(100-Calibration value) $\pm 5\%$	(100-Calibration value) $\pm 5\%$
1.5 MHz	(85-Calibration value) $^{+5}_{-15}\%$	(85-Calibration value) $^{+5}_{-15}\%$

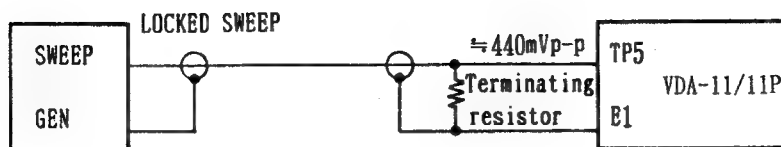
- The level differences between the fields at 1.5 MHz should be within 7.5% respectively.
- Repeat 8-5-31. C REC current frequency response adjustment (Oxide) and 8-5-32. C REC current adjustment (Oxide) so that the specification is met.

8-5-34. C REC Current Frequency Response Adjustment (Metal)

- Setting

Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
------------------------------------	-------------------------





- Connection



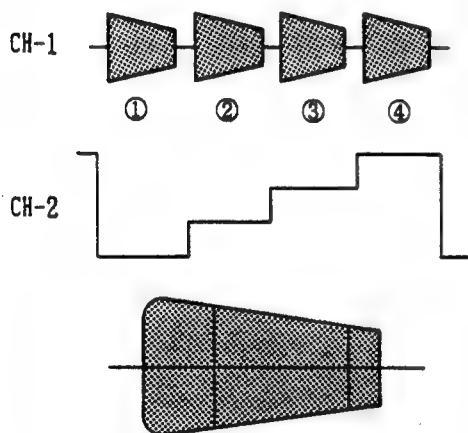
- Preparation

- Remove short-housing CNJ2 on the VDA-11/11P board, connect the Sweep Signal Generator between TP5 on the VDA-11/11P board and E1 on the VDA-11/11P board, and supply a locked sweep signal.
- Insert the BCT-20M and put the unit into the REC mode.

- Adjustment procedures

- Test point : CH-1 : TP46;Extension board
CH-2 : TP8;Extension board
- TRIG : CH-2
- Adj. point : ① :  CV1 (CH-1);VDA-11/11P
② :  CV2 (CH-2);VDA-11/11P
③ :  CV3 (CH-3);VDA-11/11P
④ :  CV4 (CH-4);VDA-11/11P

- Spec. :



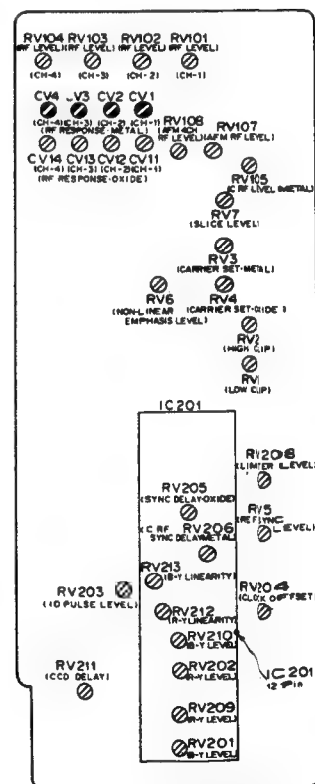
For NTSC ...	4.08MHz	10MHz
For PAL ...	3.93MHz	10MHz

For NTSC

frequency	level
4.08 MHz	100% reference
10 MHz	55±10%

For PAL

frequency	level
3.93 MHz	100% reference
10 MHz	$65^{+10}_{-15} \%$



VDA-11/11P BOARD (SOLDERING SIDE)

- **Note**

- After adjustment is completed, install short-housing CNJ2.

8-5-35. CREC Current Adjustment (Metal)

• Setting

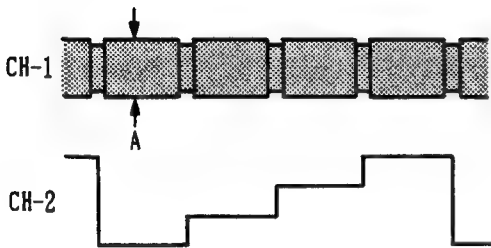
Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
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• Preparation

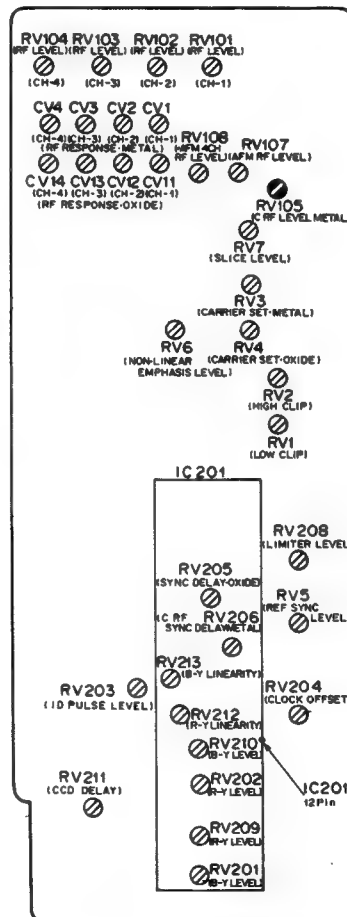
- Input signal: 0% flat field
- Connect a tantalum capacitor (1 to 10 μ F/16V) between TP35 and TP1, TP36 and TP2 on the Extension board. (TP1 and TP2 negative).
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

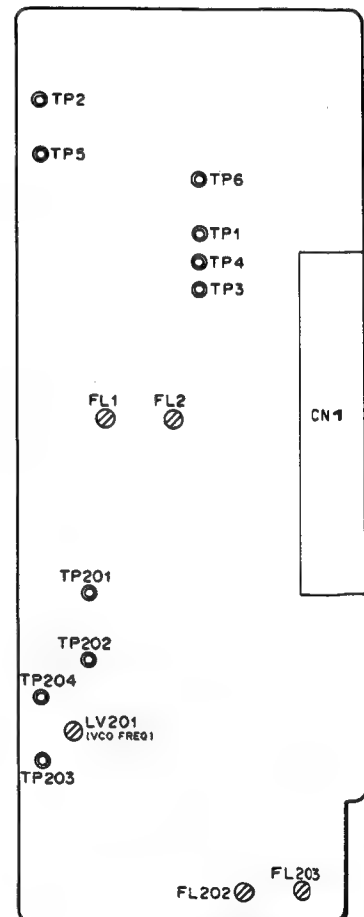
- Test point : CH-1 : TP46;Extension board
CH-2 : TP8;Extension board
- Adj. point : ● RV105 (C RF LEVEL METAL);VDA-11/11P
- Spec. : Adjust so that A is two times as high as the level of head ① which is set in Step 4 of Sec. 8-5-30 C REC Current Adjustment (Oxide).



Note: The each level of the head ① through ④ should be less than 1.0V.



VDA-11/11P BOARD (SOLDERING SIDE)



VDA-11/11P BOARD (COMPONENT SIDE)

8-5-36. C Frequency Response Check (Metal)

• Setting

Equipment: Waveform Monitor	Board:
-----------------------------	--------

• Preparation

- Calculate the calibration value on the standard player (equivalent to BVW-75/75P).
Calibration Value = (Chart 1) - (CR5-1B playback level For NTSC)
(CR5-1BPS playback level ... For PAL)

	NTSC	PAL
0.5 MHz	100%	100%
1.0 MHz	100%	100%
1.5 MHz	86%	85%

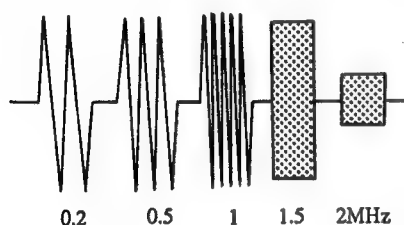
Chart 1

- Input signal: Multi burst signal
- Insert the blank tape (BCT-20M) to BVW-D600/D600P. Then put the unit into REC mode about 80 seconds.

• Adjustment procedures

CAV R-Y OUT/BVW-75/75P (or equivalent)

CAV B-Y OUT/BVW-75/75P (or equivalent)



Specification

	NTSC	PAL
frequency	level	level
0.2 MHz	100% (REFERENCE)	100% (REFERENCE)
0.5 MHz	(100-Calibration value) $\pm 5\%$	(100-Calibration value) $\pm 5\%$
1 MHz	(100-Calibration value) $\pm 5\%$	(100-Calibration value) $\pm 5\%$
1.5 MHz	(86-Calibration value) $\pm 5\%$	(85-Calibration value) $\pm 5\%$

- The level differences between the fields at 1.5 MHz should be within 7.5% respectively.
- Repeat 8-5-34. C REC current frequency response adjustment (METAL) and 8-5-35. C REC current adjustment (METAL) so that the specification is met.

8-5-37. C REF Sync Position Tentative Adjustment (Metal)

• Setting

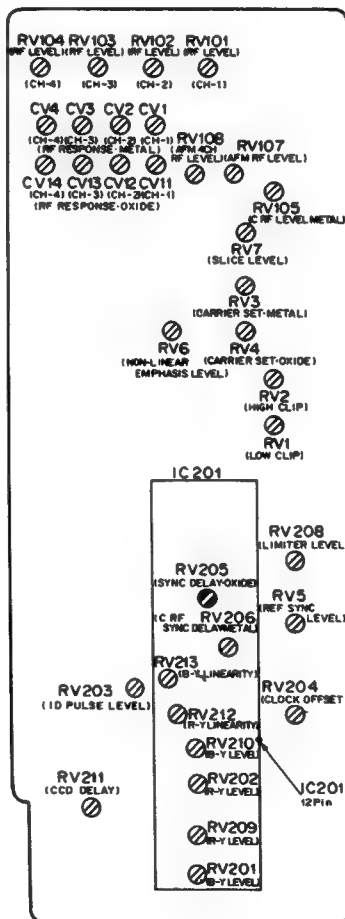
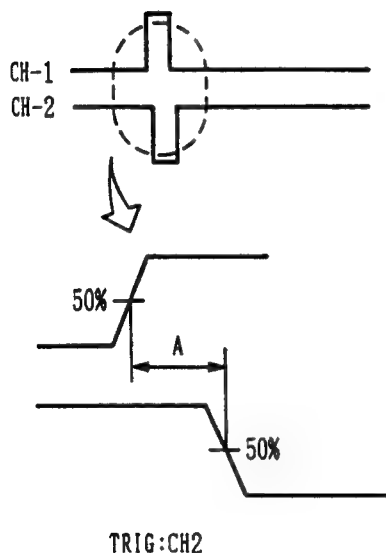
Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
------------------------------------	-------------------------

• Preparation

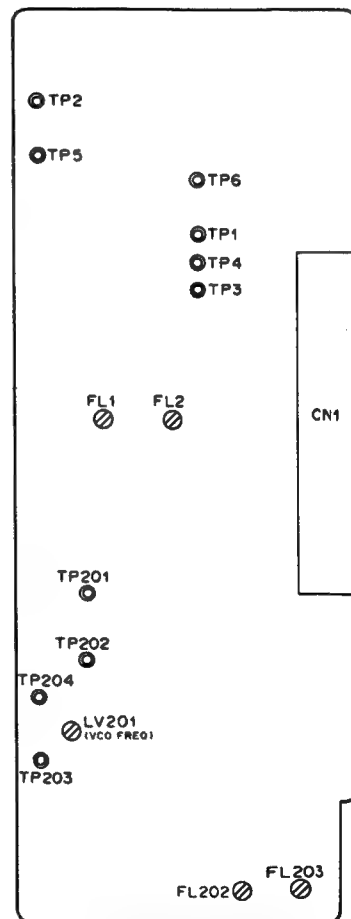
- Input signal: MOD pulse and bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : CH-1 : TP17;Extension board
CH-2 : TP3;VDA-11/11P
- Adj. point : ● RV206 (C REF SYNC
DELAY METAL);VDA-11/11P
- Spec. : For NTSC : $A = 170 \pm 5 \text{ nsec}$
For PAL : $A = 195 \pm 5 \text{ nsec}$



VDA-11/11P BOARD (SOLDERING SIDE)



VDA-11/11P BOARD (COMPONENT SIDE)

8-5-38. C REF Sync Position Tentative Adjustment (Oxide)

• Setting

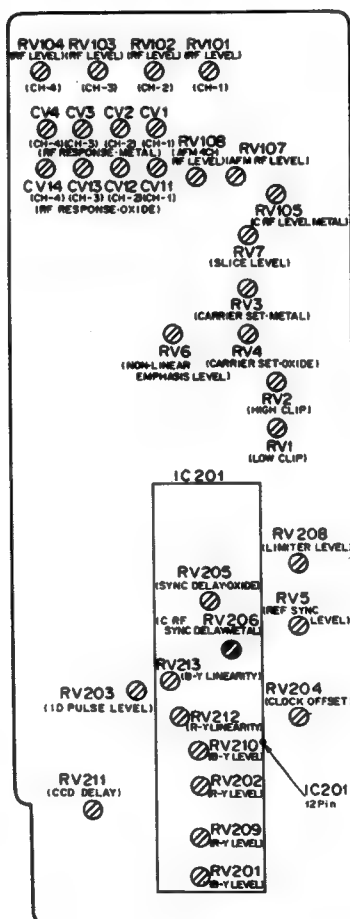
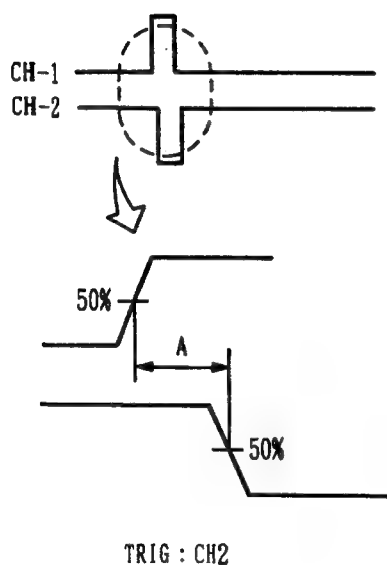
Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
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• Preparation

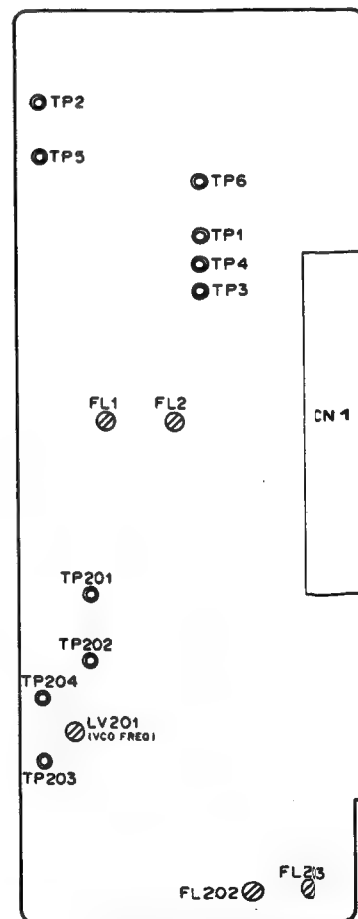
- Input signal: MOD pulse and bar
- Insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

- Test point : CH-1 : TP17;Extension board
CH-2 : TP3;VDA-11/11P
- Adj. point : ● RV205 (C REF SYNC DELAY OXIDE);VDA-11/11P
- Spec. : For NTSC : A = 170 ± 5 nsec
For PAL : A = 185 ± 5 nsec



VDA-11/11P BOARD (SOLDERING SIDE)



VDA-11/11P BOARD (COMPONENT SIDE)

8-5-39. Composite Y/C Delay Adjustment (Metal)

• Note

- A standard VTR (BVW-75/75P or the equivalent) which is adjusted to the specified value is used in this adjustment.

Step 1.

Equipment: Dual Trace Oscilloscope

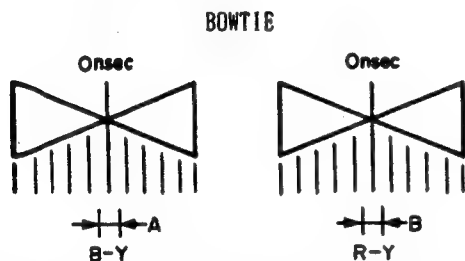
Board: VDA-11/11P board

• Preparation

- Input signal: BOWTIE (TSG-300)
- Insert the BCT-20M and put the unit into the REC mode.
- Play back the recorded tape using a standard VTR player.
- Set the Y/C DELAY control of a standard VTR player to PRESET.

• Adjustment procedures

- Test point : CAV Y } OUT/Standard VTR
CAV R-Y } (terminated by 75 ohms)
CAV B-Y }
- Spec. : A, B = ± 10 nsec



1. Check that the cross point of waveform is between A and B.
2. If the specification is not met, check that the chroma signal is advanced or delayed.

- Setting

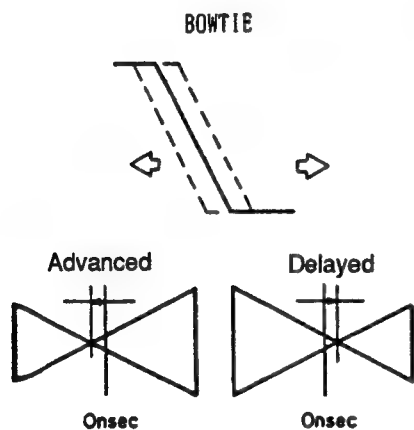
Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
------------------------------------	-------------------------

- Preparation

- Input signal: BOWTIE (TSG-300)
- Insert the BCT-20M and put the unit into the REC mode.

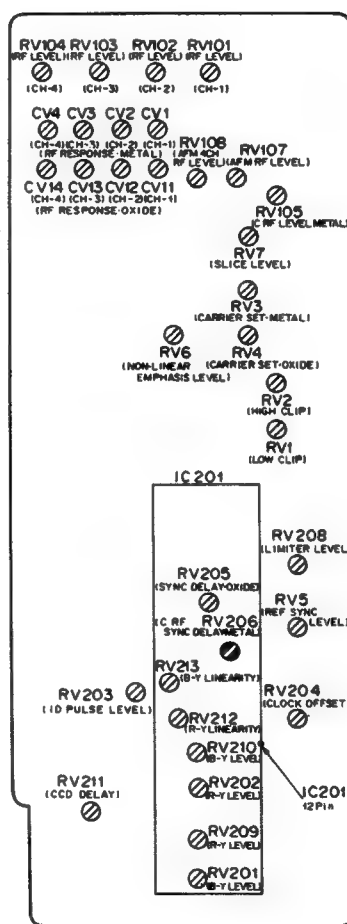
- Adjustment procedures

- Test point : TP3;VDA-11/11P
- Adj. point : ⚙ RV206 (C REF SYNC DELAY METAL);VDA-11/11P
- Spec. :

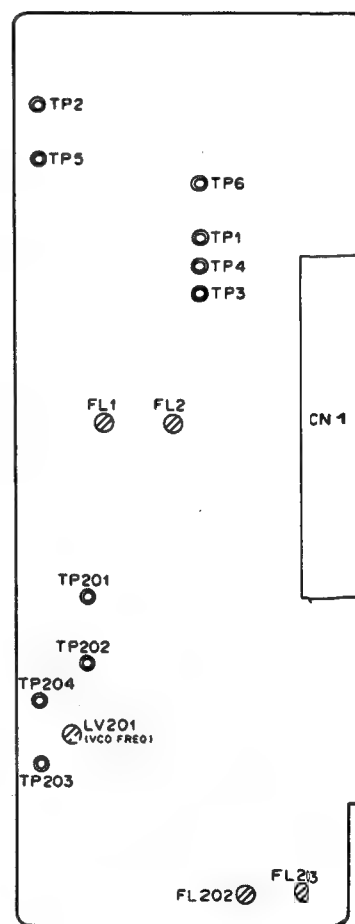


TRIG:TP17/Extension board

1. When the chroma signal is delayed, correct the REF Sync signal in the right direction.
2. When the chroma signal is advanced, correct the REF Sync signal in the left direction.
3. Adjust Steps 1 and 2 repeatedly until the specification is met.



VDA-11/11P BOARD (SOLDERING SIDE)



VDA-11/11P BOARD (COMPONENT SIDE)

8-5-40. Composite Y/C Delay Adjustment (Oxide)

• Note

- A standard VTR (BVW-75/75P or the equivalent) which is adjusted to the specified value is used in this adjustment.

Step 1.

• Setting

Equipment: Dual Trace Oscilloscope

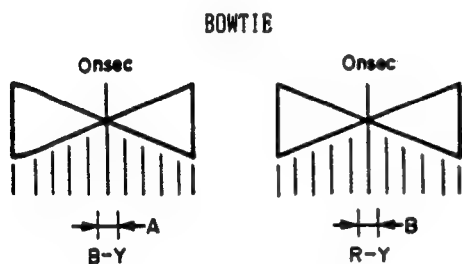
Board: VDA-11/11P board

• Preparation

- Input signal: BOWTIE
- Insert the BCT-20G and put the unit into the REC mode.
- Play back the recorded tape using a standard VTR.
- Set the Y/C DELAY control of a standard VTR to PRESET.

• Adjustment procedures

- Test point : CAV Y
CAV R-Y } OUT/Standard VTR
CAV B-Y } (terminated by 75 ohms)
- Spec. : A, B = ± 10 nsec



1. Check that the cross point of waveform is between A and B.
2. If the specification is not met, check that the chroma signal is advanced or delayed.


- Setting

Board: VDA-11/11P board

- Preparation

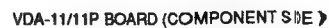
- Input signal: BOWTIE (TSG-300)
- Insert the BCT-20G and put the unit into the REC mode.

- Adjustment procedures

- Test point : TP3;VDA-11/11P
- Adj. point :  RV205 (C REF SYNC DELAY OXIDE);VDA-11/11P
- Spec. :



1. When the chroma signal is delayed, correct the REF Sync signal in the right direction.
2. When the chroma signal is advanced, correct the REF Sync signal in the left direction.
3. Adjust Steps 1 and 2 repeatedly until the specification is met.



8-5-41. AFM-RF Balance Adjustment

• Setting

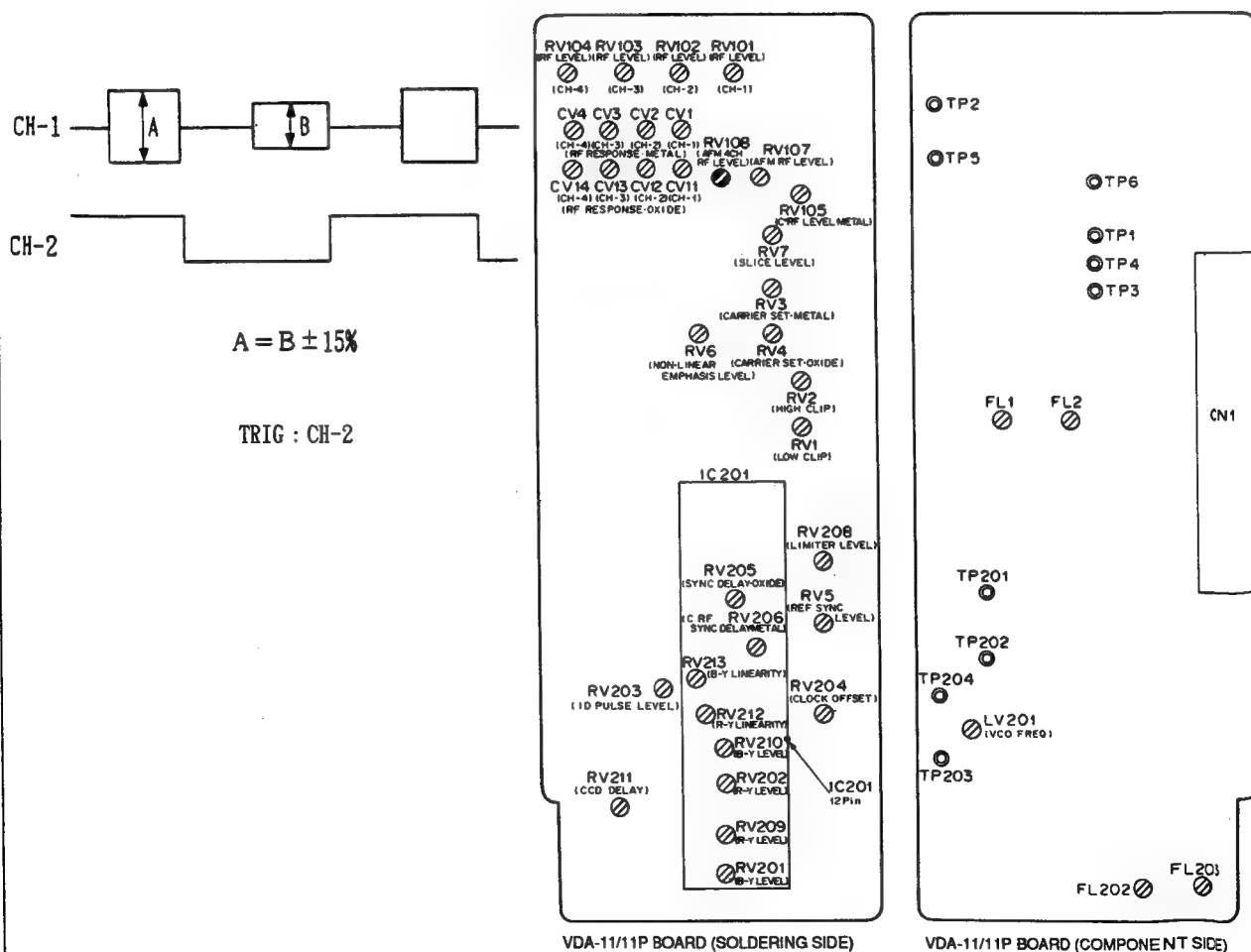
Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
------------------------------------	-------------------------

• Preparation

- AUDIO IN CH-1/CH-2: No signal
- Insert the BCT-20M and put the unit into the REC mode.
- Play back the recorded tape using a standard VTR player (BVW-75/75P or the equivalent).
- REC mode→adjustment
- Play mode→check
- Player CAP Lock Mode "4 FIELD"

• Adjustment procedures

- Test point : CH-1 : IC602-14;VO-18/18P board:
BVW-75/75P
CH-2 : TP31;EN-48/48P board:
BVW-75/75P
- Adj. point : ● RV108 (AFM 4CH REF LEVEL);VDA-11/11P
- Spec. : $A = B \pm 15\%$



8-5-42. Y PB RF Level Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

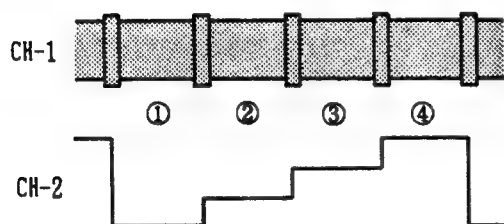
Board: VP-24/24P board

• Preparation

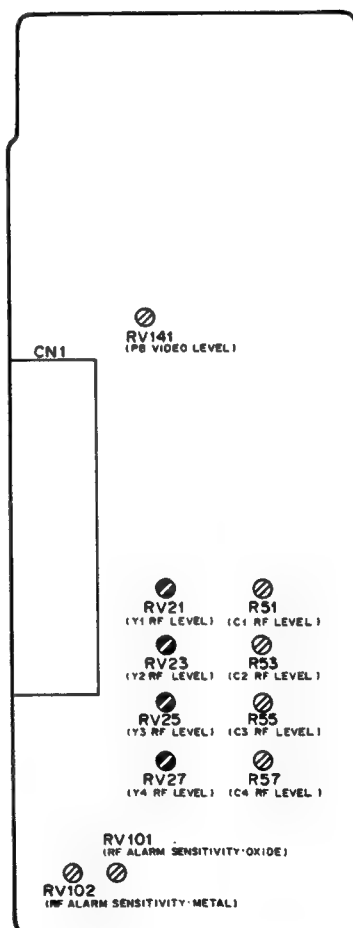
- Play back the flat field signal on the alignment tape.
For NTSC ...CR5-1B
For PALCR5-1BPS
- Make a tracking so that the RF level is maximum.

• Adjustment procedures

- Test point : CH-1 : TP33;Extension board
(Terminated by 75 ohms.)
CH-2 : TP25;Extension board
- Adj. point : ① : ● RV21 (Y1 REF LEVEL);VP-24/24P
② : ● RV23 (Y2 REF LEVEL);VP-24/24P
③ : ● RV25 (Y3 REF LEVEL);VP-24/24P
④ : ● RV27 (Y4 REF LEVEL);VP-24/24P
- Spec. : A = $220 \pm 20\text{mV}$



TRIG:CH-2



VP-24/24P BOARD (COMPONENT SIDE)

8-5-43. C PB RF Level Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

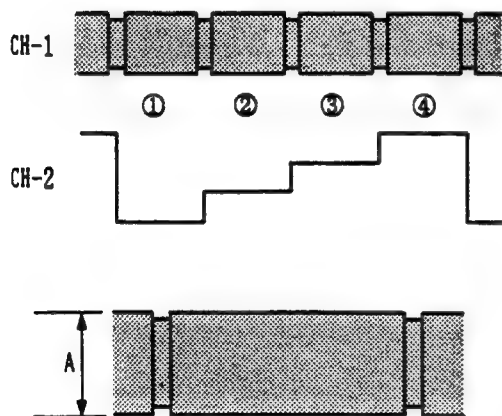
Board: VP-24/24P board

• Preparation

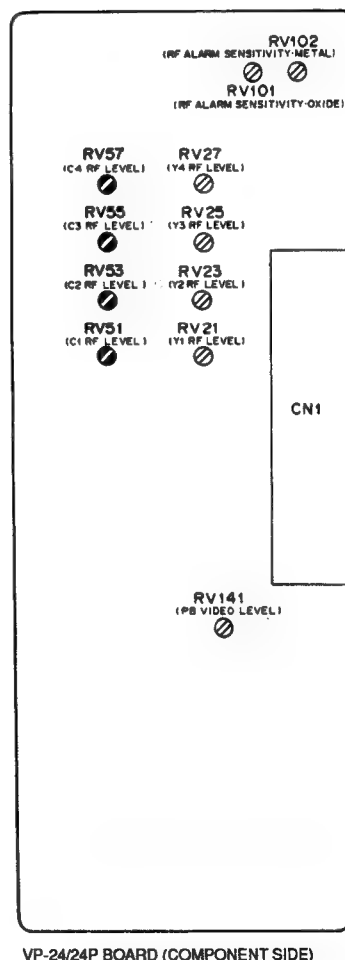
- Play back the flat field signal on the alignment tape.
For NTSC ... CR5-1B
For PAL CR5-1BPS
- Make a tracking so that the RF level is maximum.

• Adjustment procedures

- Test point : CH-1 : TP31;Extension board
(Terminated by 75 ohms.)
CH-2 : TP25;Extension board
- Adj. point : ① : ● RV51 (C1 RF LEVEL);VP-24/24P
② : ● RV53 (C2 RF LEVEL);VP-24/24P
③ : ● RV55 (C3 RF LEVEL);VP-24/24P
④ : ● RV57 (C4 RF LEVEL);VP-24/24P
- Spec. : A = $220 \pm 20\text{mV}$



TRIG : CH-2



8-5-44. VF PB Output Level Adjustment

• Setting

Equipment: Dual Trace Oscilloscope	Board: VP-24/24P board
------------------------------------	------------------------

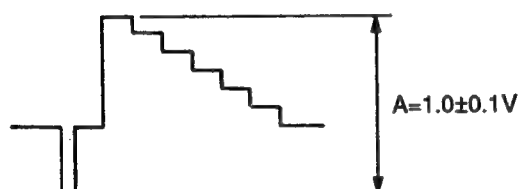
• Adjustment procedures

- Test point : TP38;Extension board
- Adj. point : Step 1.
 ● RV141 (PB VIDEO LEVEL) ;VP-24/24P
- Spec. : For NTSC : $A = 1.0 \pm 0.1V$
 For PAL : $A = 1.0 \pm 0.1V$

Step 1.

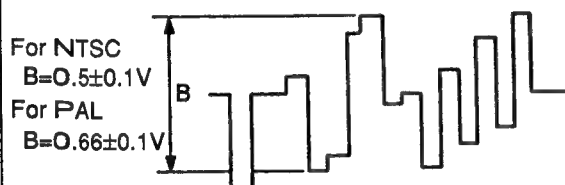
- Play back the color-bar signal on the following alignment tape.

For NTSC : CR5-1B
 For PAL : CR5-1BPS

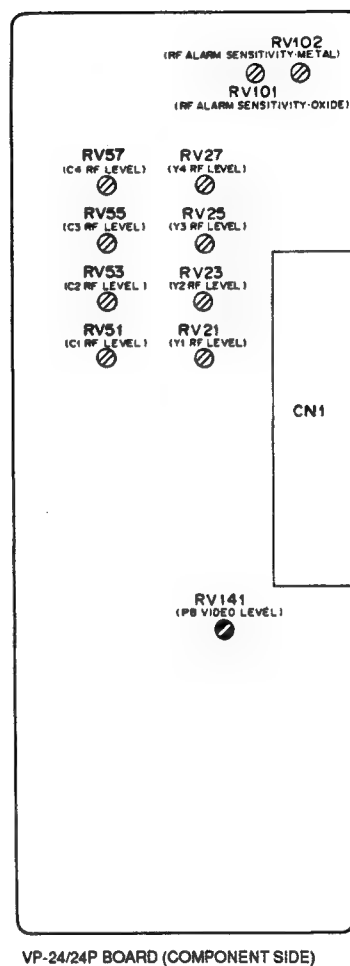


Step 2.

- Press the CTDM button.



Check that level B is $0.5 \pm 0.1 V$ (for NTSC)/ $0.66 \pm 0.1 V$ (for PAL).



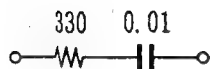
8-5-45. RF Alarm Sensitivity Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

Board: VP-24/24P board

• Chip cord with CR.

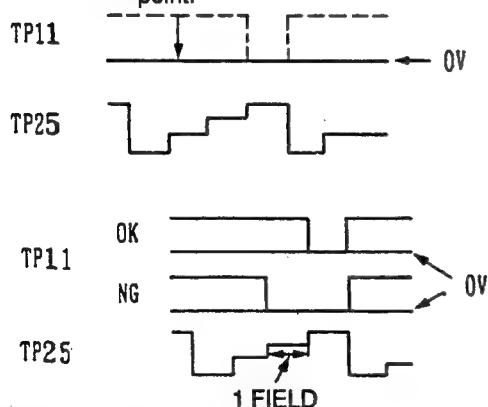


• Preparation

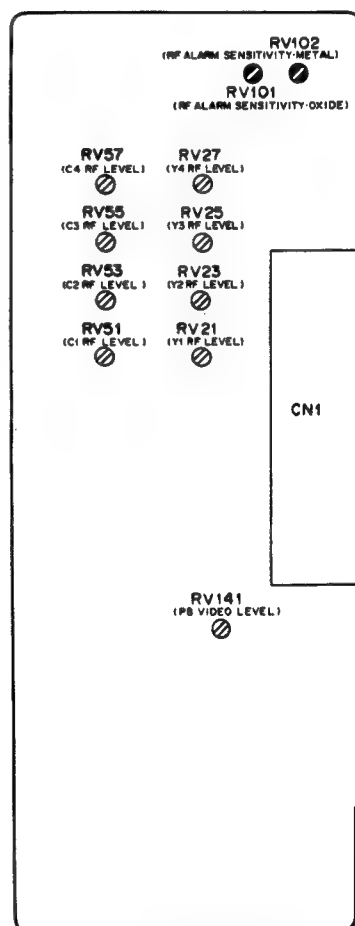
- Input signal: built-in color-bar
- Connect the clip cord with CR between TP26 and TP1 on the extension board.

• Adjustment procedures

- Test point : TP11;Extension board:VP-24/24P
TP25;Extension board: VP-24/24P
- Adj. point : • OXIDE adjustment
● RV101(RF ALARM SENSITIVITY): OXIDE;VP-24/24P
• METAL adjustment
● RV102 (RF ALARM SENSITIVITY): METAL;VP-24/24P
- Spec. : Adjust so that the pulse waveform of the TP11 becomes 0V level point.



1. Insert the BCT-20G and put the unit into the REC mode. (OXIDE adjustment)
2. After OXIDE adjustment, insert the BCT-20M and put the unit into the REC mode. (METAL mode)
3. After adjustment is completed, remove the clip cord.
4. Confirm that the waveform of the TP11 is not fall to 0V in over 2 fields continuously.
If not, readjust the procedures 1~3.



VP-24/24P BOARD (COMPONENT SIDE)

The video system adjustment method has been changed along with the changes of the video board (VDA-11). Adjust according to the serial number on the right.

Serial No.	Adjustment page
10366 and higher (UC) 40166 and higher (EK)	8-89~8-149

8-5. VIDEO SYSTEM ADJUSTMENT

[Equipment]

- Component signal Generator: TEKTRONIX TSG-300 or the equivalent
- Digital Voltmeter
- Dual trace Oscilloscope
- Frequency counter
- Sweep Generator
- Spectrum Analyzer
- DC power: AC-550/550CE or the equivalent
- Waveform Vector Monitor: TEKTRONIX 1750A (for NTSC)/1751A (for PAL) or the equivalent
- Standard VTR player: BVW-75/75P or the equivalent
- Rec Current Adj Tool
 - For NTSC : EW-571 (J-6335-710-A)
 - For PAL : EW-594 (J-6335-940-A)
- Video signal Input Board: JX-250 (J-6392-500-A)
- Deviation checker: EW-579 (J-6335-790-A)
- Setup attenuator tool: EW-607 (J-6336-070-A)
- * NOTE: This fixture (EW-607) is the same that fixture already has been used for BVW-300/300A/400/400A series.
- Blank tape: BCT-20G or BCT-20M
- Alignment Tape:
 - For NTSC : CR5-2A (8-960-097-44): OXIDE
 - For NTSC : CR5-1B (8-960-096-41): METAL
 - For PAL : CR5-2APS (8-960-098-44): OXIDE
 - For PAL : CR5-1BPS (8-960-096-91): METAL

[Switches setting on the function panel]

Do not change the setting below unless otherwise specified.

- VTR switch: STBY
- OUTPUT/DCC selector: BARS

* Alignment tape : (OXIDE)

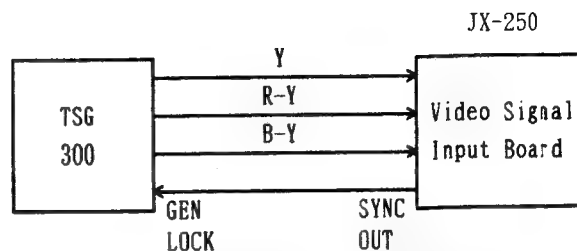
- For NTSC : CR5-2A
- For PAL : CR5-2APS

NOTE: The Alignment tape marked "A" at the TOP of the tape number as "TAPE No. A0123..." are made change in the signal contents.
Then, some adjustments are made change.

TIME min.sec	VIDEO TRACK	DESCRIPTION
0:00	75% Color Bar	
2:00		
	Multi Burst	Y: 0.5, 1, 2, 3, 4.1, 4.5 MHz C: 0.2, 0.5, 1, 1.5 MHz
6:00	Bowtie & 10T	C: No Signal
9:00	Pulse & Bar	
11:00	Sw'P Shifted	
13:00		
	Composite Monoscope (Switching position is shifted.)	Video Phase
15:00		

[Preparation] (When using the signal except from the built-in color-bar.)

1. Remove the DA-66 board.
2. Insert the Video Signal Input Board and connect as illustrated below.



3. After adjustment is completed, install the DA-66 board and check (or readjust) Sec. 8-5-4. CTDM Level Adjustment and 8-5-16. Y Input Level Adjustment using a BARS signal from the camera.

* Alignment tape : (METAL)

- For NTSC : CR5-1B
- For PAL : CR5-1BPS

TIME min.sec	VIDEO	AFM
0:00	RF SWEEP Marker 1, 2, 4, 6, 8, 10, 12 MHz	No-Signal
2:00	60% H.SWEEP (CTDM) Marker 0, 5, 1, 2, 3, 4, 5 MHz	
5:00	PULSE & BAR (CTDM)	
8:00	MULTI BURST Y: 0.5, 1, 2, 3, 4.1, 4.5 MHz (For NTSC) 0.5, 1.2, 4, 5, 5.5 MHz (For PAL) C: 0.2, 0.5, 1, 1.5, 2 MHz	
11:00	PULSE & BAR	
14:00		
	100% COLOR BARS	400 Hz sine wave (25 kHz deviation)
16:30		(75 kHz deviation)
17:00	50% BOWTIE & 10T	No-Signal
19:00	LINE 17A SIGNAL	
22:00	QUAD PHASE	
24:00	FLAT FIELD	
26:00	100% COLOR BARS with dropout	
28:00	COMPOSITE H.SWEEP with VISC	
30:00		

8-5-1. PLL VCO Error Voltage Adjustment

• Setting

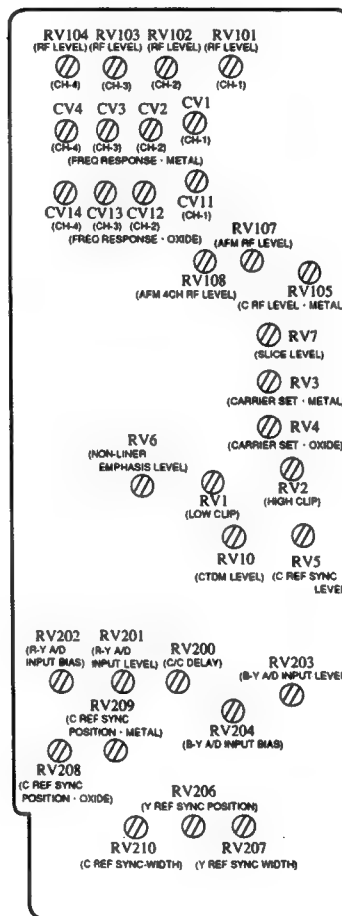
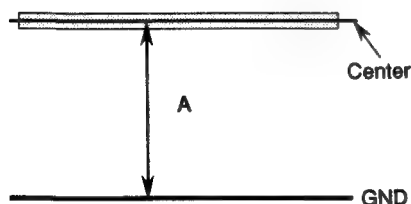
Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
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• Preparation

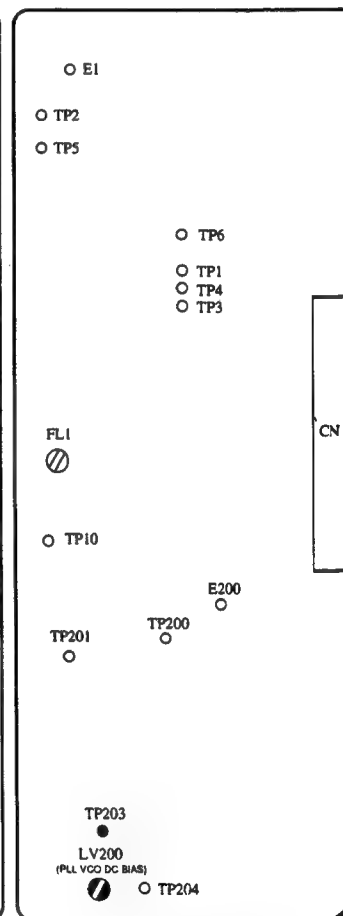
- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP203;VDA-11/11P
- Adj. point : ●LV200 (PLL VCO DC BIAS);VDA-11/11P
- Spec. : $A = 1.80 \pm 0.05V_{dc}$



VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

8-5-2. R-Y, B-Y A/D Clamp Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

Board: VDA-11/11P board

• Preparation

- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

• Test point : TP10;VDA-11/11P

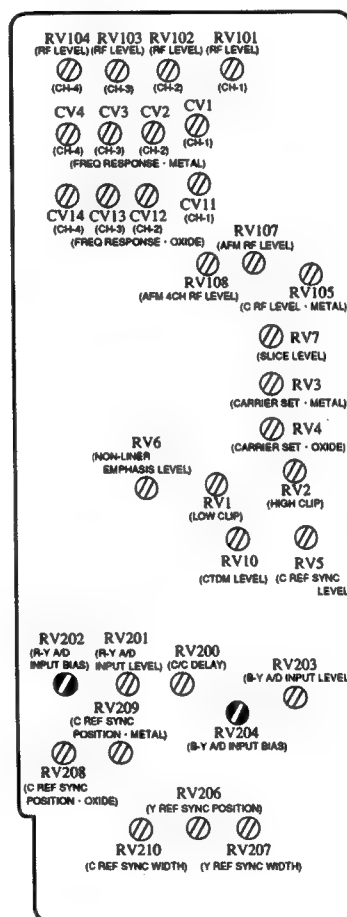
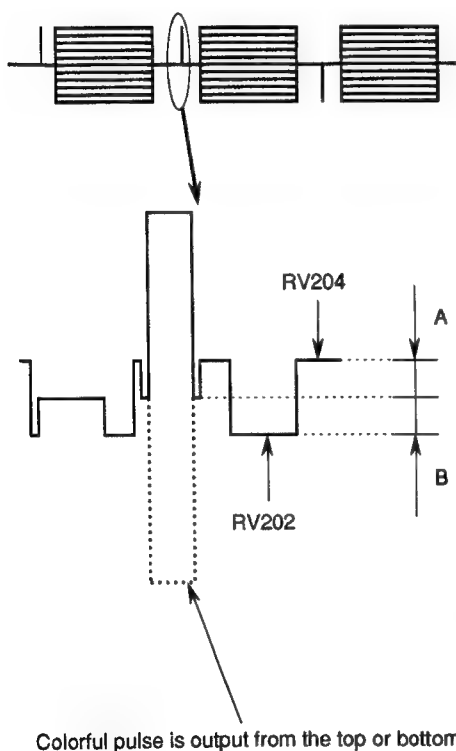
• Adj. point : R-Y Level

●RV202 (R-Y A/D INPUT BIAS);VDA-11/11P

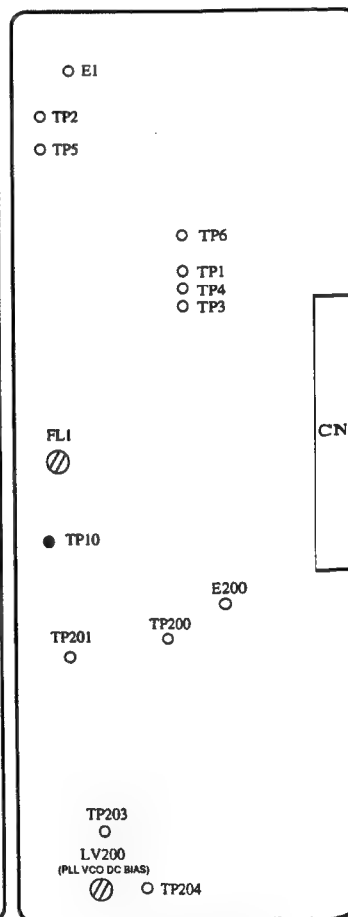
B-Y Level

●RV204 (B-Y A/D INPUT BIAS);VDA-11/11P

• Spec. : A = B = 0 (No difference)



VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

8-5-3. R-Y, B-Y A/D Input Level Adjustment

• Setting

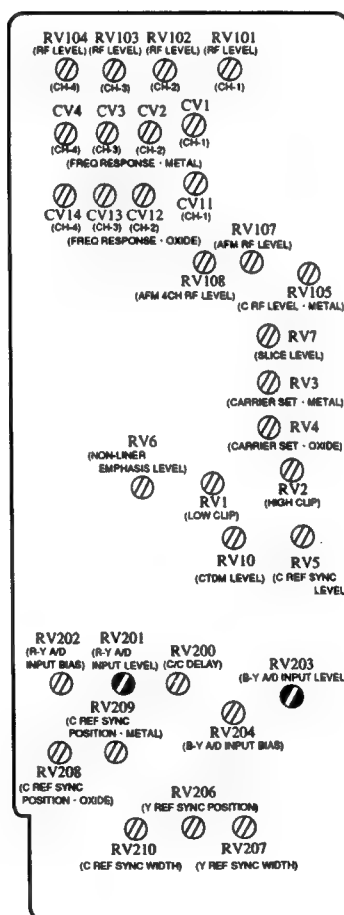
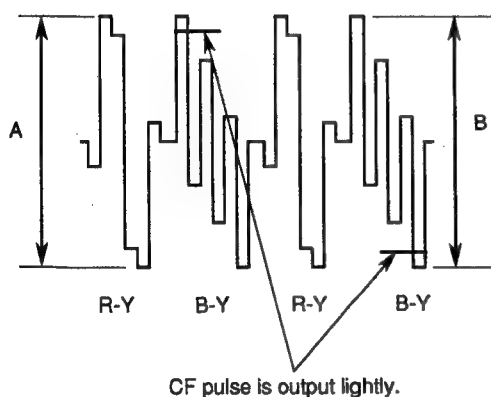
Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
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• Preparation

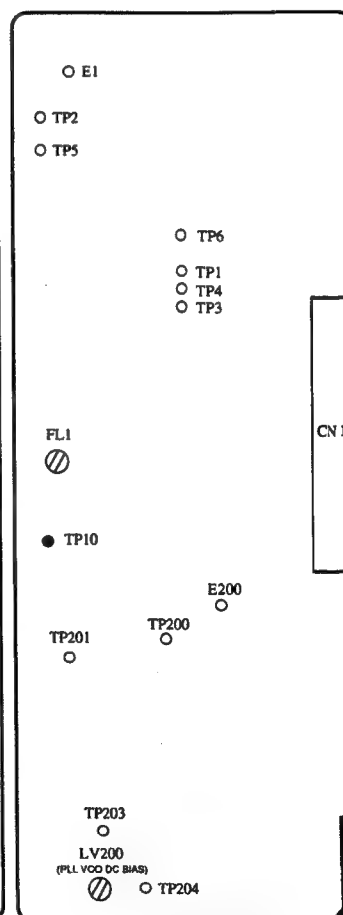
<ul style="list-style-type: none"> • built-in color-bar • Insert the BCT-20M and put the unit into the REC mode.
--

• Adjustment procedures

- Test point : TP10;VDA-11/11P
- Adj. point : R-Y Level
 - RV201 (R-Y A/D INPUT LEVEL);VDA-11/11P
- Spec. : For NTSC : A = B = 700 ± 10 mVp-p
- For PAL : A = B = 750 ± 10 mVp-p



VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

8-5-4. CTDM Level Adjustment

• Setting

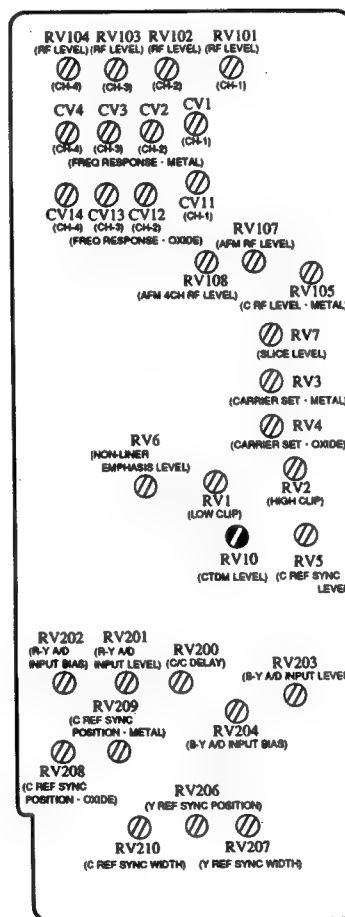
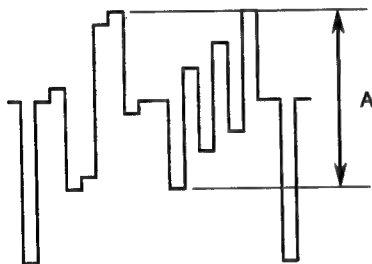
Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
------------------------------------	-------------------------

• Preparation

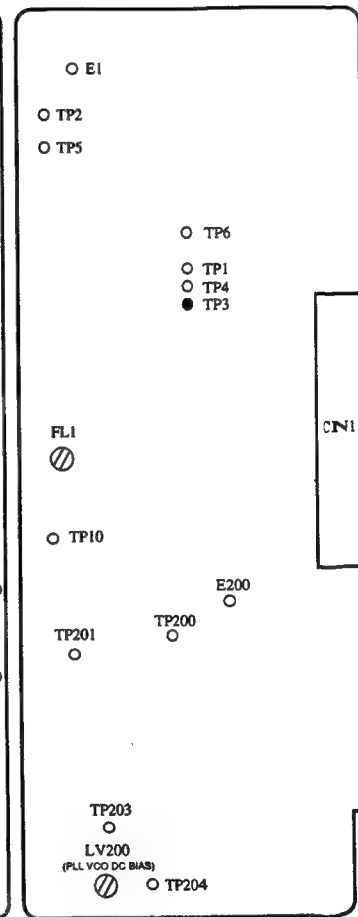
- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP3;VDA-11/11P
- Adj. point : \odot RV10 (CTDM LEVEL);VDA-11/11P
- Spec. : For NTSC : $A = 500 \pm 10$ mVp-p
For PAL : $A = 667 \pm 10$ mVp-p



VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

8-5-5. C REF Sync Level Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

Board: VDA-11/11P board

• Preparation

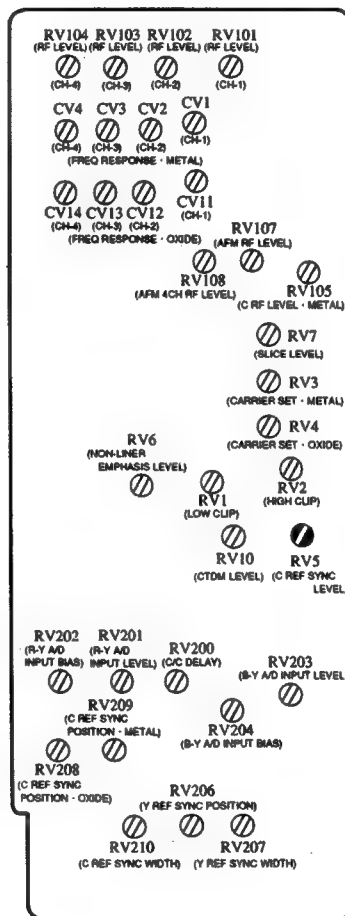
- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.
- Extend VDA board using the extension board.

• Adjustment procedures

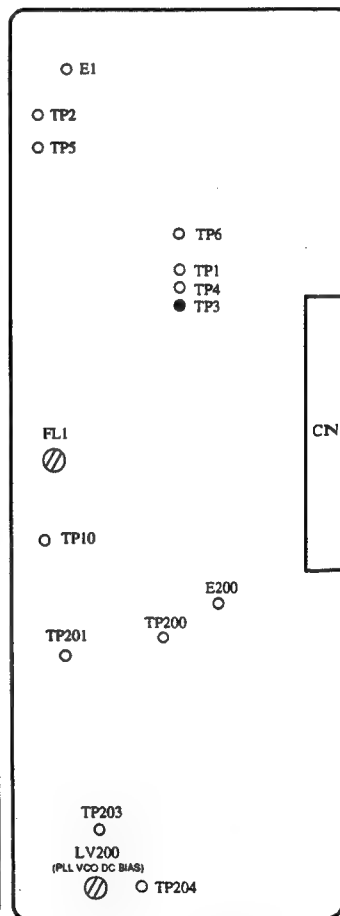
- Test point : TP3;VDA-11/11P
- Adj. point : ●RV5 (C REF SYNC LEVEL);VDA-11/11P
- Spec. : For NTSC : $A = 0.525 \pm 0.01V$
For PAL : $A = 0.598 \pm 0.01V$



TRIG : INT



VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

8-5-6. C REF Sync Pulse Adjustment

• Setting

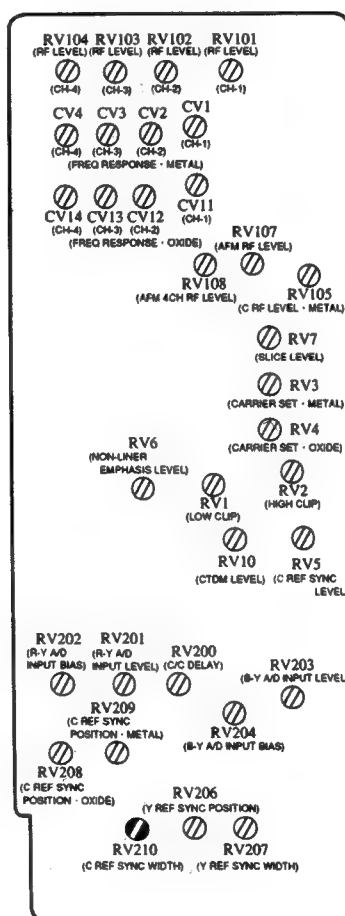
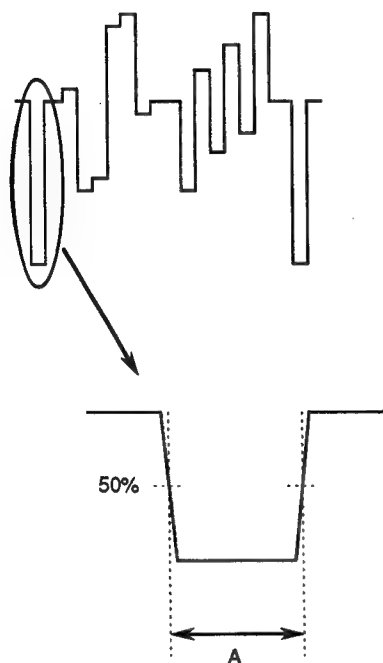
Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
------------------------------------	-------------------------

• Preparation

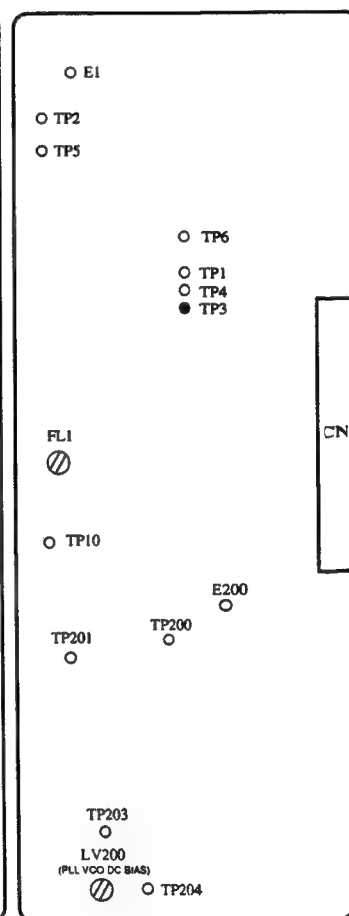
<ul style="list-style-type: none"> • built-in color-bar • Insert the BCT-20M and put the unit into the REC mode.
--

• Adjustment procedures

- Test point : TP3;VDA-11/11P
- Adj. point : \bullet RV210 (C REF SYNC WIDTH);VDA-11/11P
- Spec. : For NTSC : $A = 1.90 \pm 0.05 \mu\text{sec}$
For PAL : $A = 2.00 \pm 0.05 \mu\text{sec}$



VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

8-5-7. C REF Sync Trapezoid Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

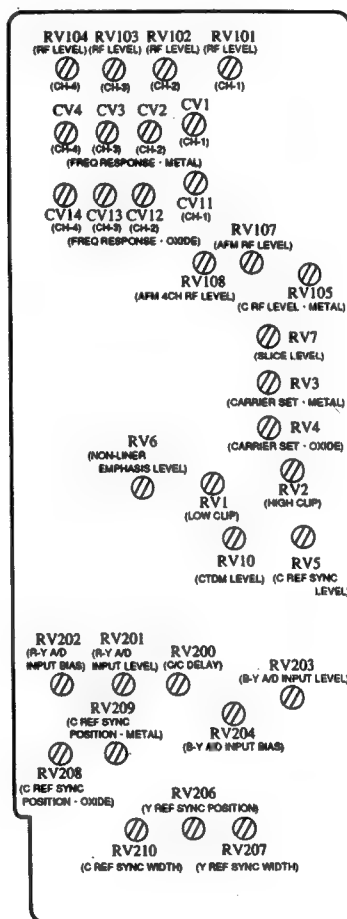
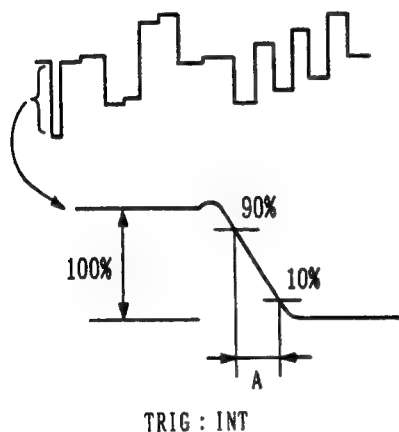
Board: VDA-11/11P board

• Preparation

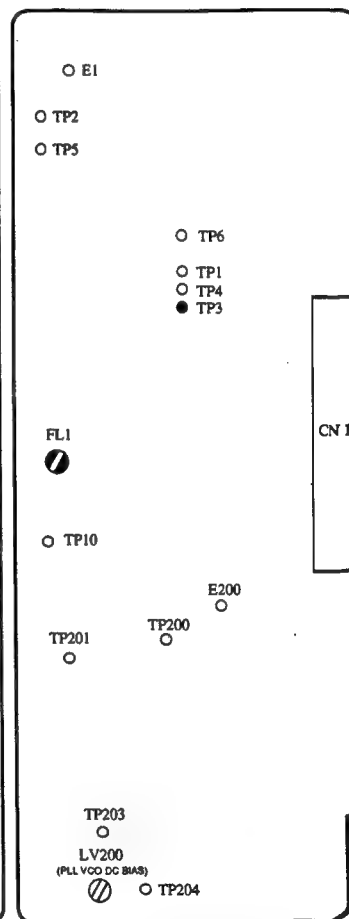
- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.
- Extend VDA board using the extension board.

• Adjustment procedures

- Test point : TP3;VDA-11/11P
- Adj. point : ●FL1;VDA-11/11P
- Spec. : $A = 220 \pm 20 \text{ nsec}$



VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

8-5-8. C Carrier/Deviation Adjustment—

1) Adjustment using Spectrum Analyzer

Step.1

• Setting

Equipment: Spectrum Analyzer

Board: VDA-11/11P board

• Preparation

- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.
- Extend VDA board using the extension board.

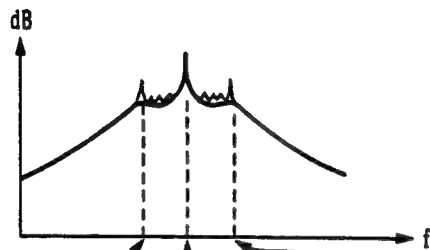
• Adjustment procedures

- Test point : TP5;VDA-11/11P
- Adj. point : Carrier adjustment
 ●RV3
 (CARRIER SET METAL);VDA-11/11P

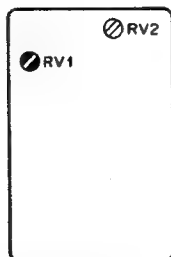
Deviation adjustment

- RV1 (IC2);VDA-11/11P

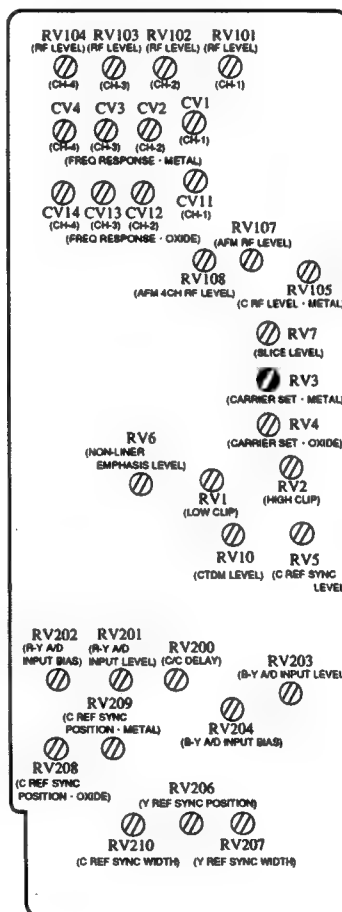
- Spec. : Carrier adjustment
 Set the center peak level as follows.
 For NTSC ... 5.3MHz
 For PAL 6.1MHz
- : Deviation adjustment
 Set the gap between the two peaks to 1MHz.
 For NTSC ... 4.8MHz and 5.8MHz
 For PAL 5.6MHz and 6.6MHz



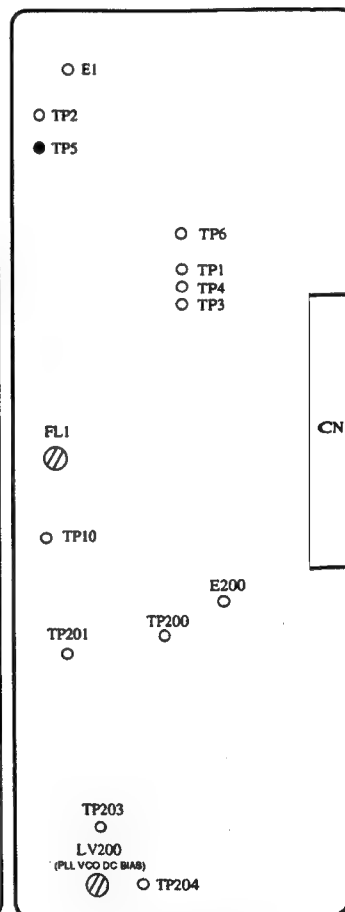
For NTSC...4.8MHz 5.3±0.005MHz 5.8MHz
 For PAL...5.6MHz 6.1±0.005MHz 6.6MHz



H1C (IC2)
 (COMPONENT SIDE)
 —On the VDA-11/11P Board—



VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

Step 2

• Setting

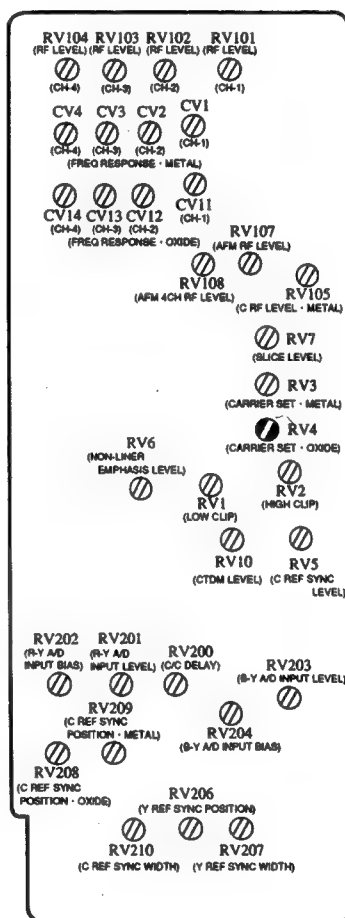
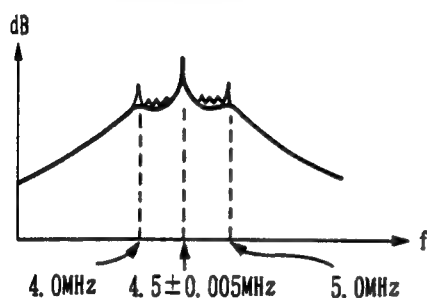
Equipment: Spectrum Analyzer	Board: VDA-11/11P board
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• Preparation

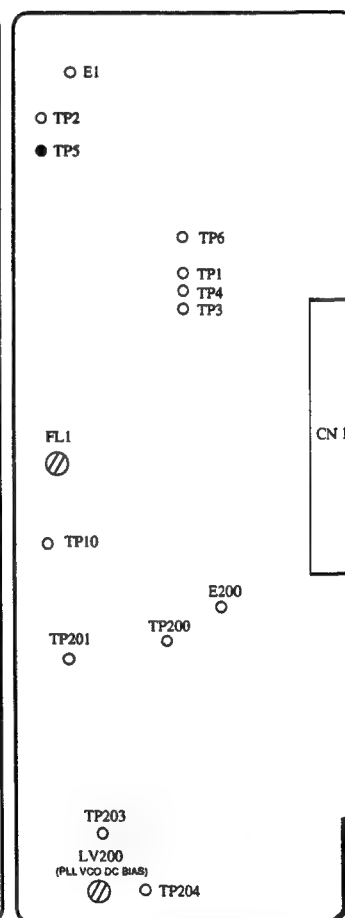
- built-in color-bar
- Insert the BCT-20G and put the unit into the REC mode.
- Extend VDA board using the extension board.

• Adjustment procedures

- Test point : TP5;VDA-11/11P
- Adj. point : Carrier adjustment
 ●RV4
 (CARRIER SET OXIDE)
 ;VDA-11/11P
- Spec. : Carrier adjustment
 Set the center peak level to 4.5MHz.



VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

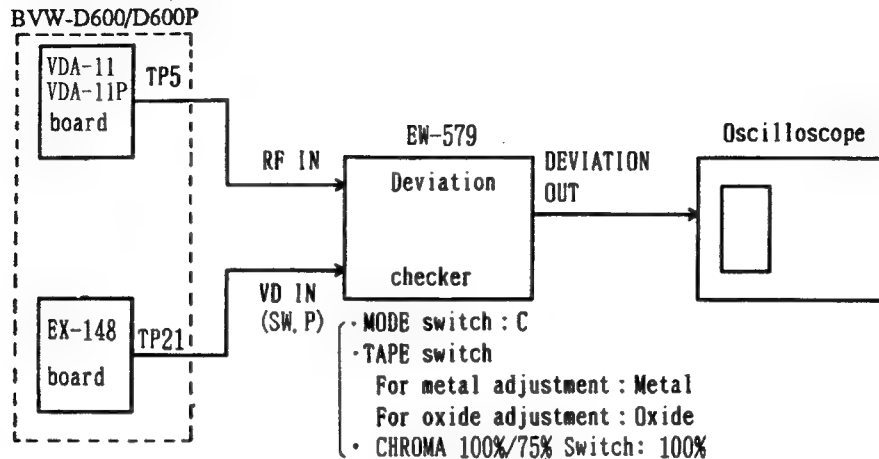
2) Adjustment using Deviation Checker

• Setting

Equipment: Dual Trace Oscilloscope

Board: VDA-11/11P board

• Connection

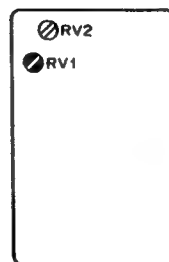
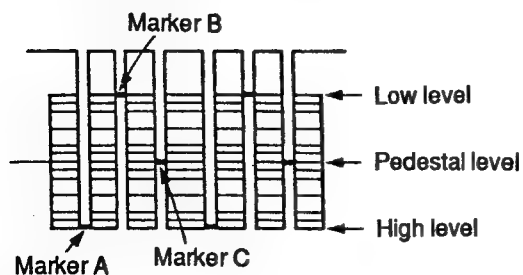


• Preparation

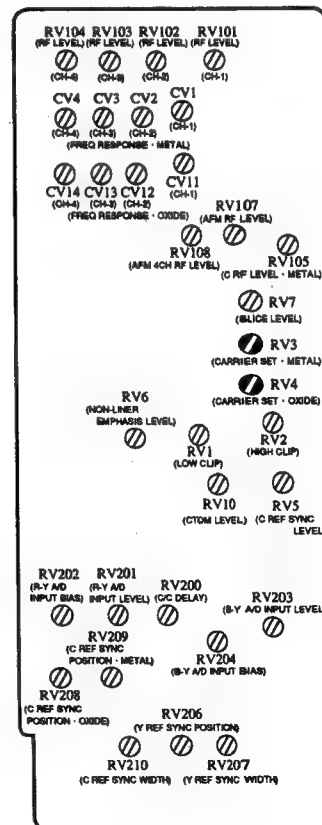
- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.
- After metal adjustment is completed, insert the BCT-20G and put the unit into the REC mode.
- Extend VDA board using the extension board.

• Adjustment procedures

- Test point : DEVIATION OUT (DEVIATION CHECKER)
- Adj. point :
 - METAL (BCT-20M)
 - Marker C adjustment (Carrier setting)
 - RV3 (CARRIER SET-METAL)
 - ;VDA-11/11P
 - Marker A and B adjustment (deviation)
 - RV1 (IC2);VDA-11/11P
 - OXIDE (BCT-20G)
 - Marker C Adjustment (Carrier setting)
 - RV4 (CARRIER SET-OXIDE)
 - ;VDA-11/11P
- Spec. : Procedure
 1. Set marker C to the pedestal level.
 2. Set marker A to the high level and marker B to the low level.
 3. Set oxide marker C to the pedestal level.



HIC (IC2)
(COMPONENT SIDE)
- On the VDA-11 Board -



VDA-11/P BOARD(SOLDERING SIDE)

8-5-9. C Low Clip Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

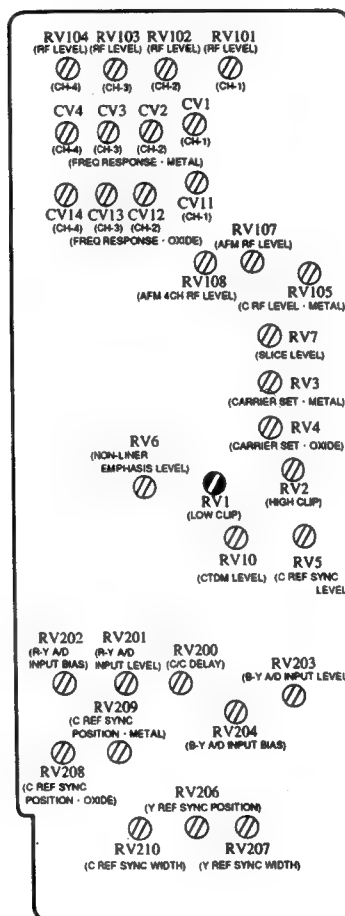
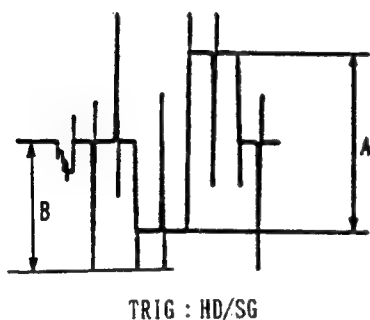
Board: VDA-11/11P board

• Preparation

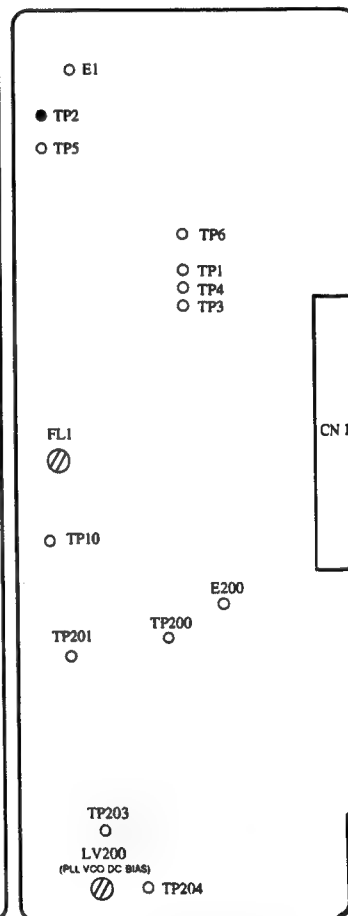
- Input signal: pulse & bar (3T, 2T)
- Insert the BCT-20G and put the unit into the REC mode.
- Extend VDA board using the extension board.

• Adjustment procedures

- Test point : TP2;VDA-11/11P
- Adj. point : ●RV1 (LOW CLIP)
;VDA-11/11P
- Spec. : A=R-Y/B-Y level
A=100% (reference)
For NTSC : $B=A \times 160 \pm 5\%$
For PAL : $B=A \times 120 \pm 5\%$



VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

8-5-10. C High Clip Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

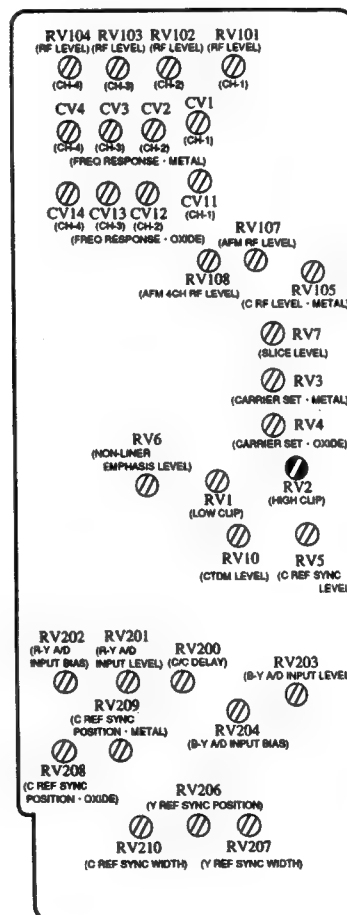
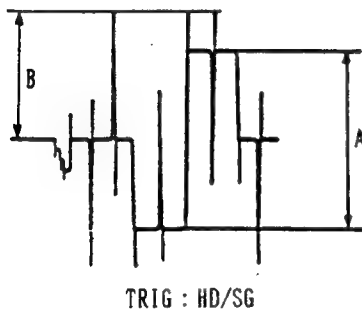
Board: VDA-11/11P board

• Preparation

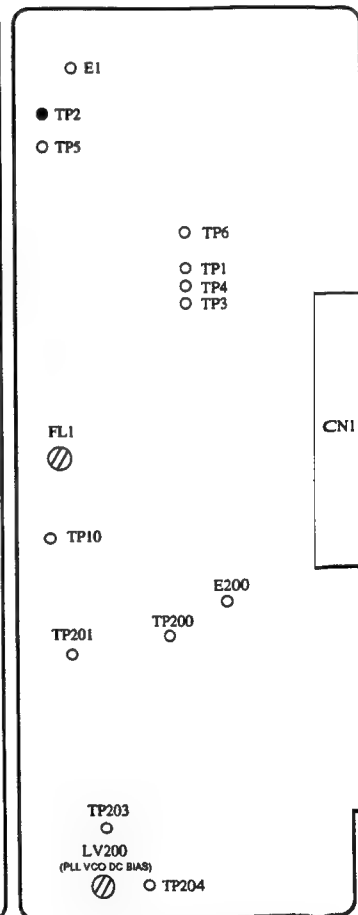
- Input signal: pulse & bar (3T, 2T)
- Insert the BCT-20M and put the unit into the REC mode.
- Extend VDA board using the extension board.
- After level A is measured, set the chroma level to +6dB and adjust level B.
If the chroma level of the Signal Generator can not be +6dB, remove the R-Y, B-Y terminated resistors R8 (82-ohm) and R10 (82-ohm) on the Video Signal Input board (JX-250) temporarily and perform the adjustment.

• Adjustment procedures

- Test point : TP2;VDA-11/11P
- Adj. point : ●RV2 (HIGH CLIP)
;VDA-11/11P
- Spec. : A=R-Y/B-Y level
A=100% (reference)
For NTSC : B=305±5%
For PAL : B=285±5%



VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

8-5-11. C Nonlinear Emphasis Level Adjustment

• Setting

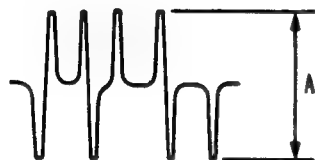
Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
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• Preparation

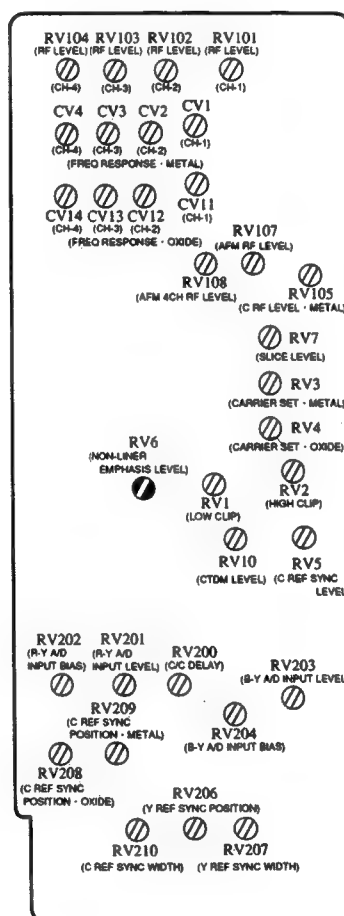
- Input signal: pulse & bar (3T, 2T)
- Insert the BCT-20M and put the unit into the REC mode.
- Extend VDA board using the extension board.

• Adjustment procedures

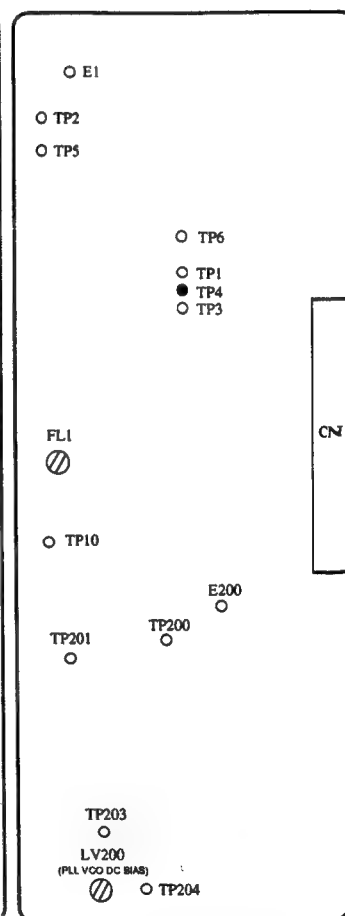
- Test point : TP4;VDA-11/11P
- Adj. point : ●RV6 (NON-LINEAR EMPHASIS LEVEL);VDA-11/11P
- Spec. : $A=76\pm 2\text{mV}$



TRIG : HD/SG



VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

8-5-12. C REC HF Adjustment

• Setting

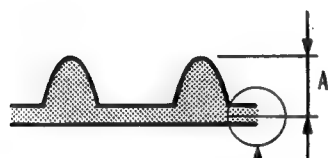
Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
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• Preparation

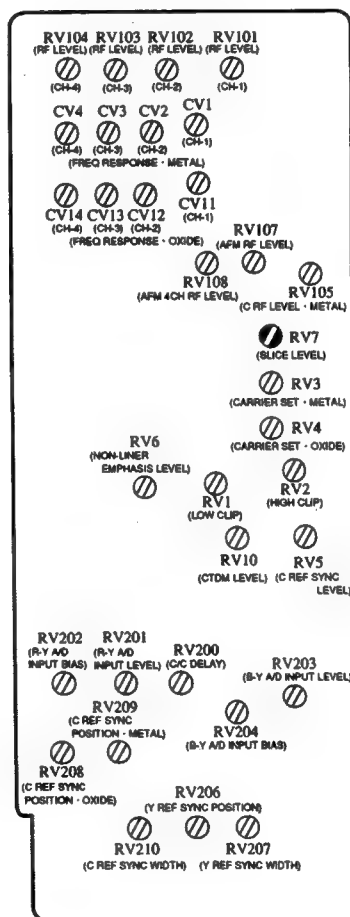
- Y, B-Y input signal: 0% flat field
- R-Y input signal: H sweep (For only RF, 1Vp-p/75ohms) TP39/Extension board.
- Insert the BCT-20M and put the unit into the REC mode.
- Extend VDA board using the extension board.

• Adjustment procedures

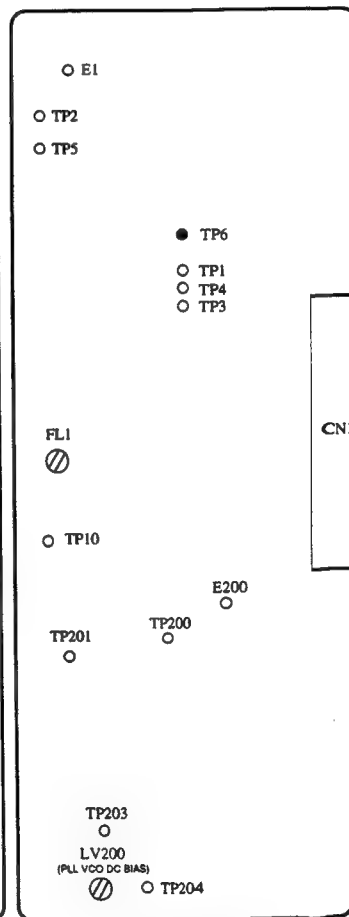
- Test point : TP6;VDA-11/11P
- Adj. point : ●RV7 (SLICE LEVEL);VDA-11/11P
- Spec. : $A=60\pm 2\text{mVp-p}$



Measured at the waveform center.



VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

8-5-13. C MOD Carrier Balance Adjustment

• Setting

Equipment: Spectrum Analyzer

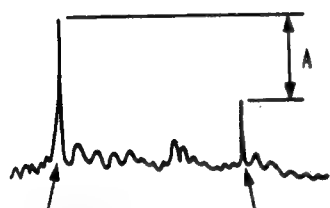
Board: VDA-11/11P board

• Preparation

- Input signal: 0% flat field
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

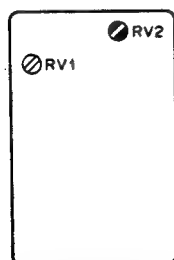
- Test point : TP5;VDA-11/11P
- Adj. point : ●RV2 (HIGH CLIP);VDA-11/11P
- Spec. : For NTSC : Minimize the level at 10.6MHz.
(A=40dB or more)
: For PAL : Minimize the level at 12.2MHz.
(A=40dB or more)



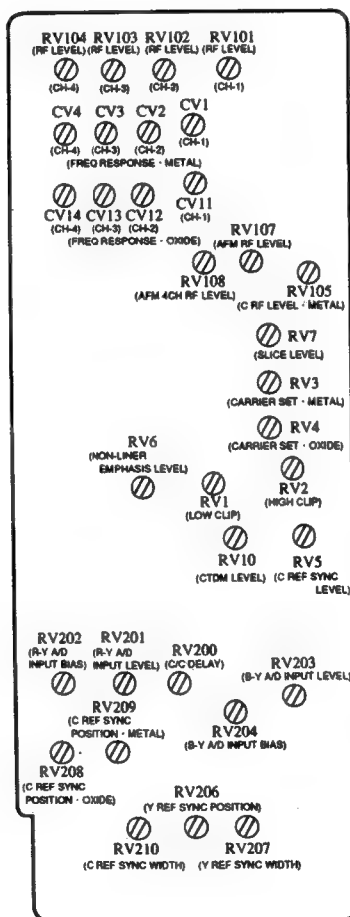
For NTSC : 5.3MHz — 10.6MHz

For PAL : 6.1MHz — 12.2MHz

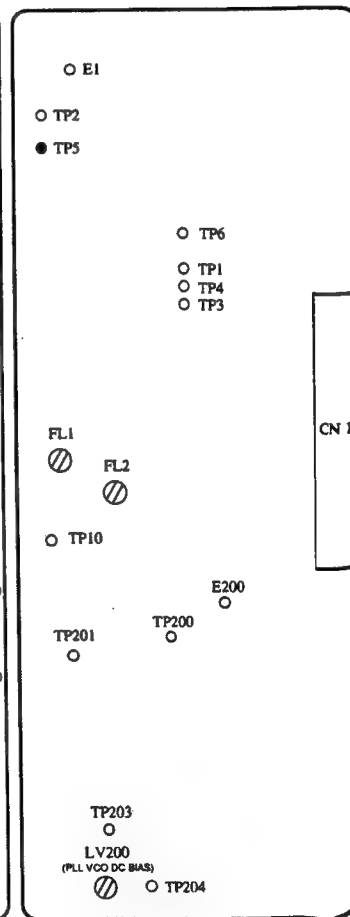
TRIG:INT



HIC (IC2)
(COMPONENT SIDE)
—On the VDA-11/11P Board—



VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

8-5-14. Y REF Sync Position Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

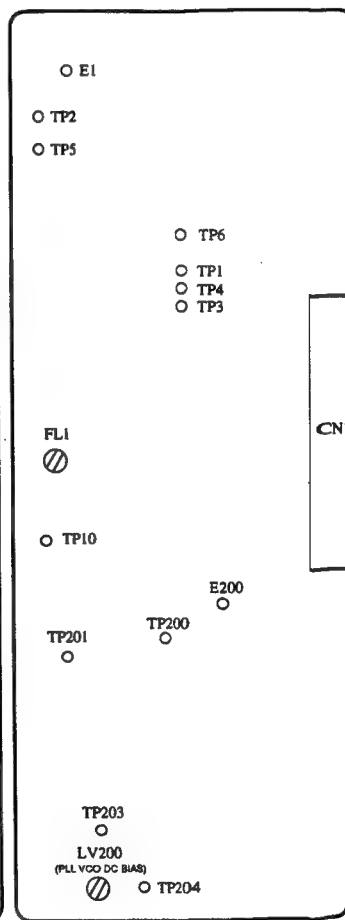
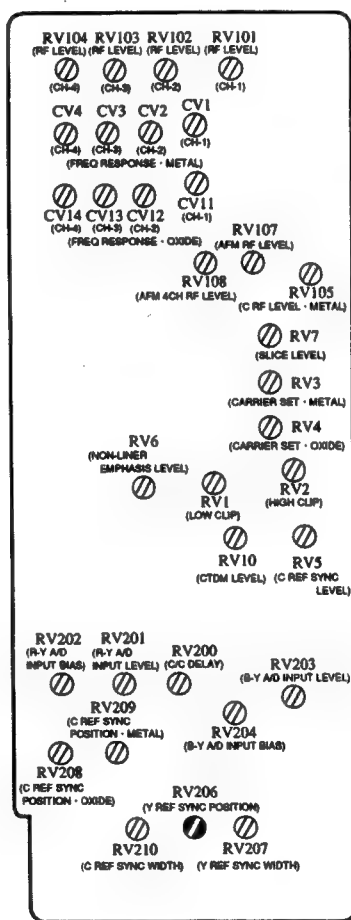
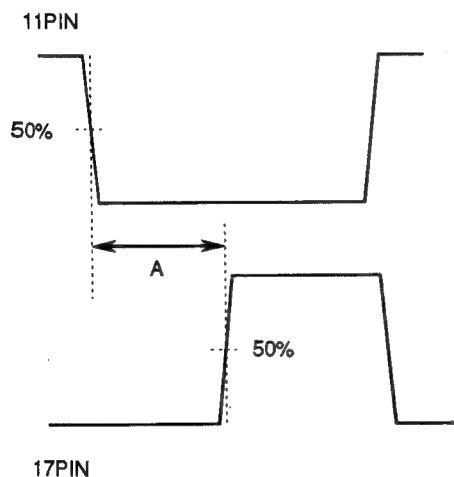
Board: VDA-11/11P board

• Preparation

- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP11;Extension board
TP17;Extension board
- Adj. point : ●RV206 (Y REF SYNC POSITION);VDA-11/11P
- Spec. : $A = 2.65 \pm 0.02 \mu\text{sec}$



8-5-15. Y REF Sync Pulse Adjustment

• Setting

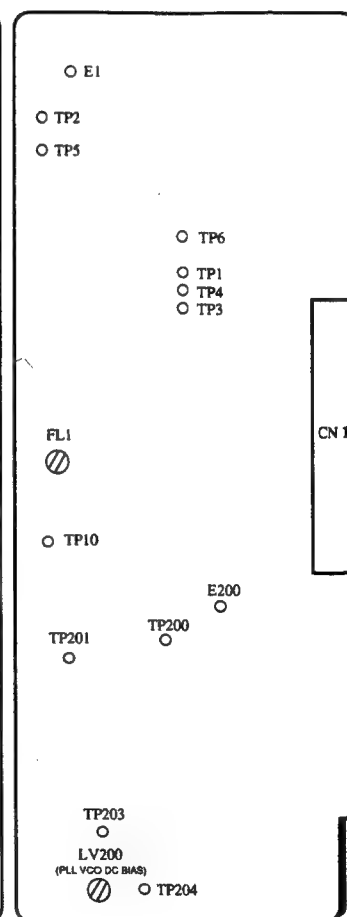
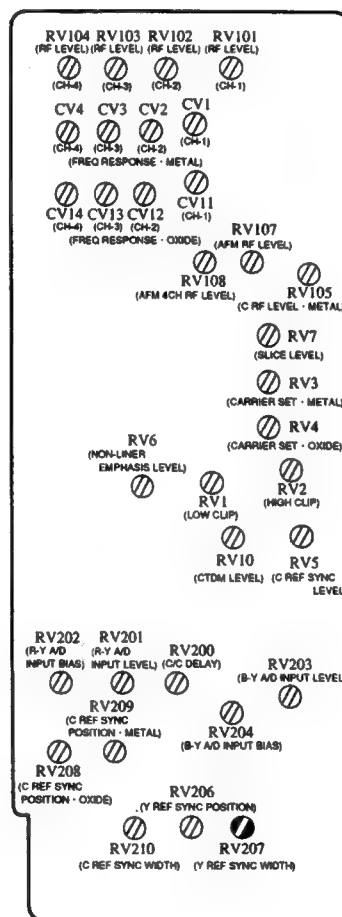
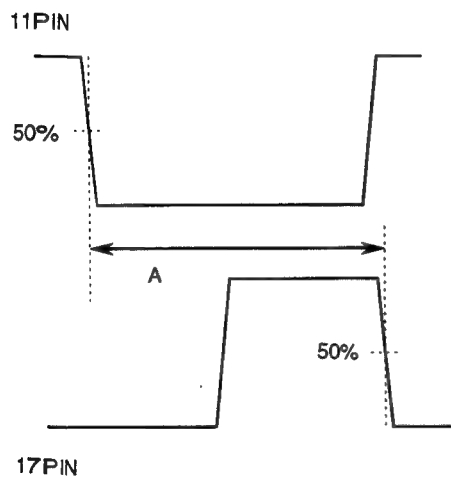
Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
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• Preparation

- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP11;Extension board
TP17;Extension board
- Adj. point : ●RV207 (Y REF SYNC WIDTH);VDA-11/11P
- Spec. : A = $5.00 \pm 0.05 \mu\text{sec}$



8-5-16. Y Input Level Adjustment

• Setting

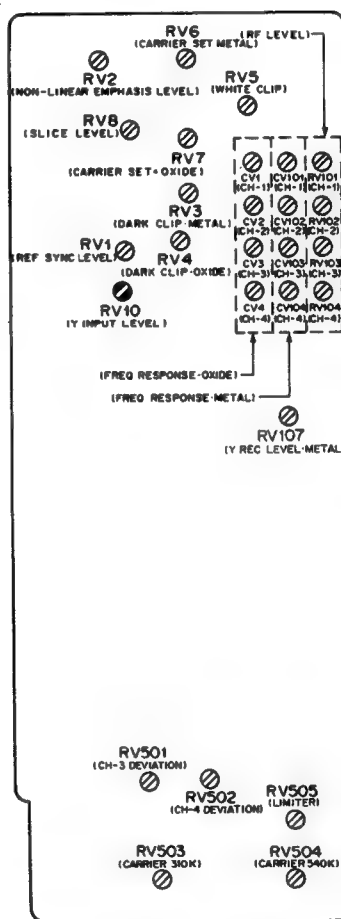
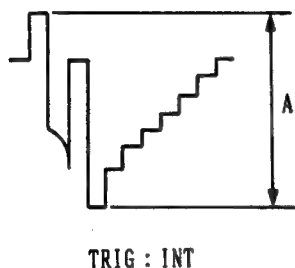
Equipment: Dual Trace Oscilloscope	Board: AFM-6/6P board
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• Preparation

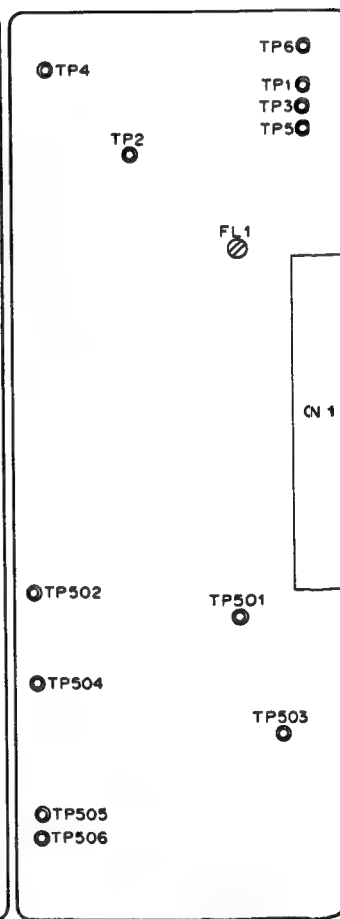
<ul style="list-style-type: none"> • built-in color-bar • Insert the BCT-20M and put the unit into the REC mode.
--

• Adjustment procedures

- Test point : TP5;AFM-6/6P
- Adj. point : ●RV10 (Y INPUT LEVEL);AFM-6/6P
- Spec. : $A=1.0\pm0.02V$



AFM-6/6P BOARD (SOLDERING SIDE)



AFM-6/6P BOARD (COMPONENT SIDE)

8-5-17. Y REF Sync Level Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

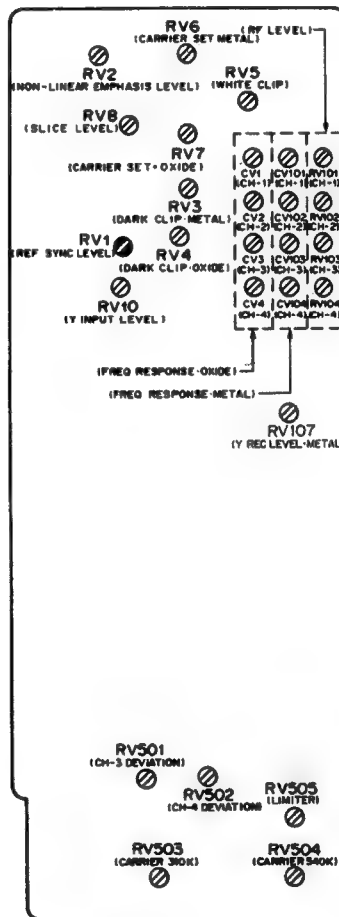
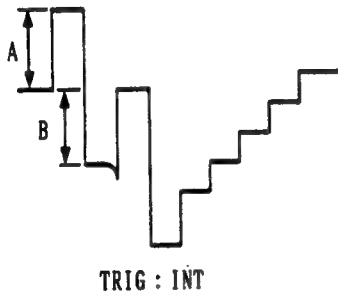
Board: AFM-6/6P board

• Preparation

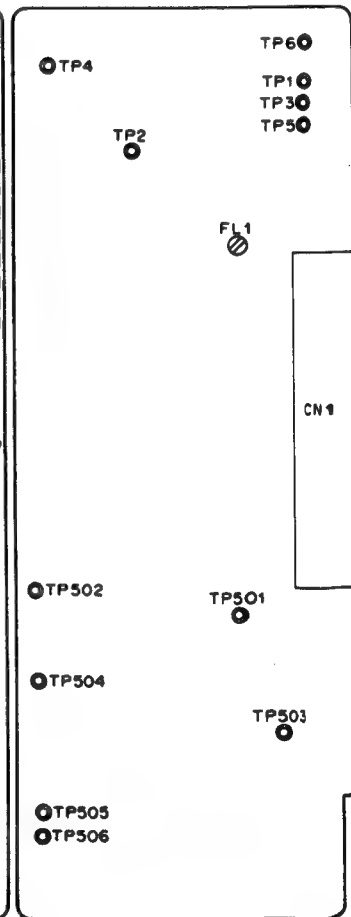
- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP5;AFM-6/6P
- Adj. point : RV1 (REF SYNC LEVEL);AFM-6/6P
- Spec. : A:B=100:125±2.5%



AFM-6/6P BOARD (SOLDERING SIDE)



AFM-6/6P BOARD (COMPONENT SIDE)

8-5-18. Y REF Sync Slant Adjustment

• Setting

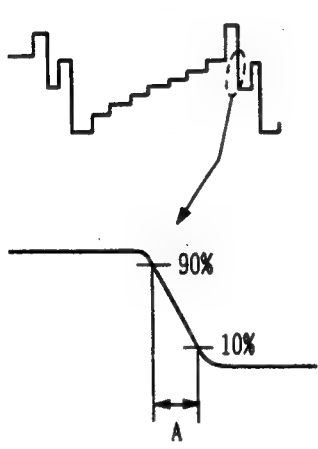
Equipment: Dual Trace Oscilloscope	Board: AFM-6/6P board
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• Preparation

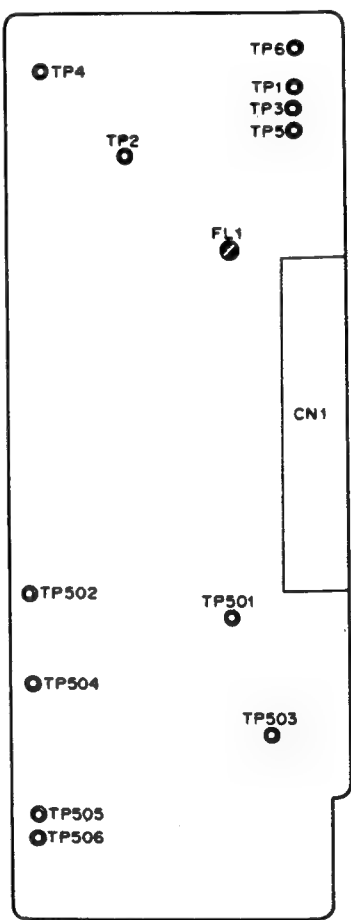
- Built-in-color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP5;AFM-6/6P
- Adj. point : FL1;AFM-6/6P
- Spec. : $A=180\pm20\text{nsec}$



TRIG : INT



AFM-6/6P BOARD (COMPONENT SIDE)

8-5-19. Y Carrier/Deviation Adjustment

1) Adjustment using Spectrum Analyzer

Step 1

• Setting

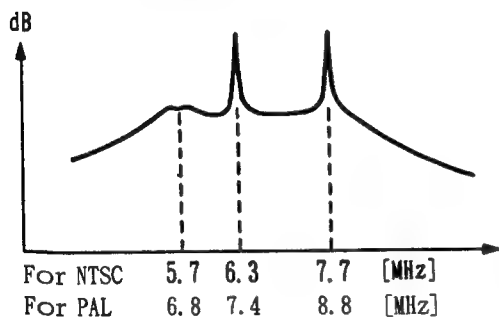
Equipment: Spectrum Analyzer	Board: AFM-6/6P board
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• Preparation

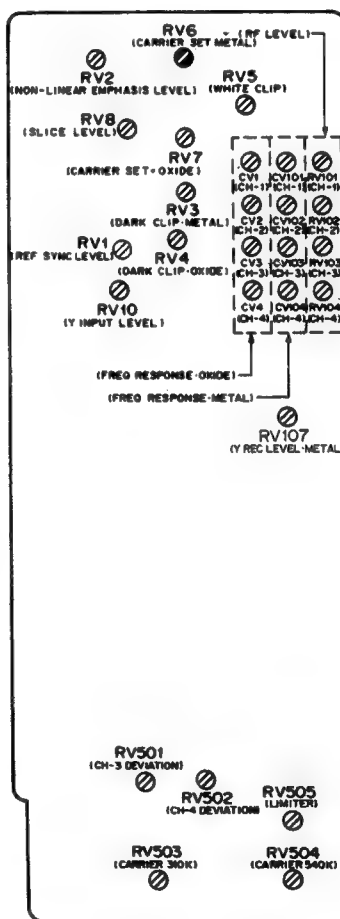
- Input signal: Color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

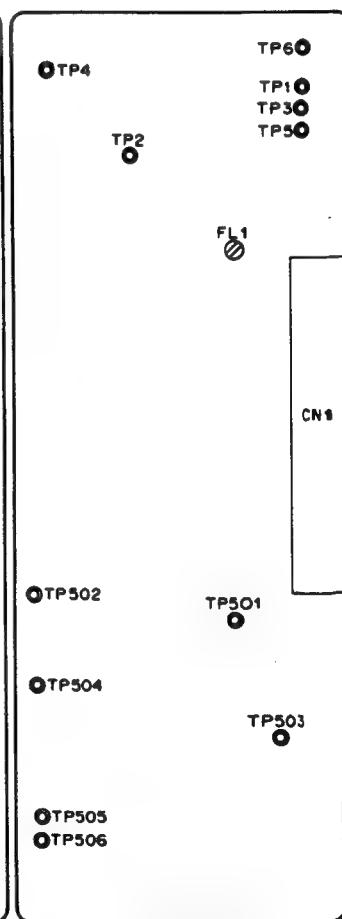
- Test point : TP4;AFM-6/6P
- Adj. point :
 - Sync tip carrier adjustment
 - RV6 (CARRIER SET METAL);AFM-6/6P
 - Deviation adjustment
 - RV1 (IC1) ;AFM-6/6P
- Spec. :
 - Sync tip carrier adjustment
 - Set the left side peak level as follows.
 - For NTSC ...5.7MHz
 - For PAL6.8MHz
 - Deviation adjustment
 - Set the gap between two peaks to 1.4MHz.



HIC (IC 1)
(COMPONENT SIDE)
—On the AFM-6/6P Board—



AFM-6/6P BOARD (SOLDERING SIDE)



AFM-6/6P BOARD (COMPONENT SIDE)

Step 2.

• Setting

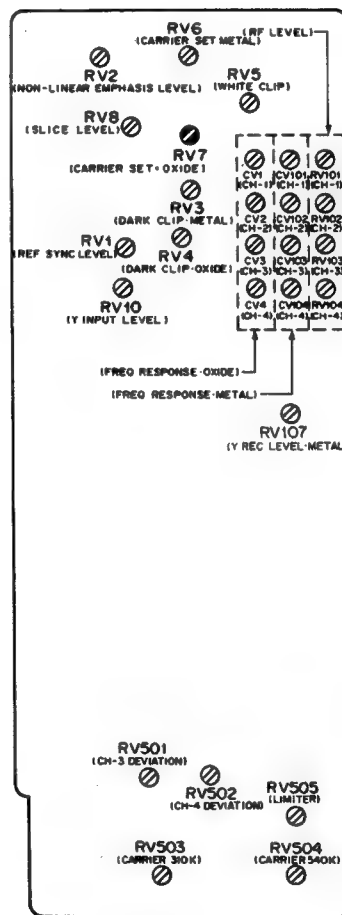
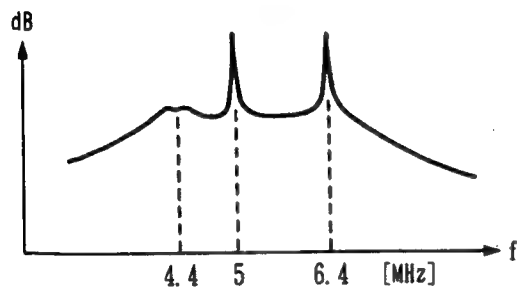
Equipment: Spectrum Analyzer	Board: AFM-6/6P board
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• Preparation

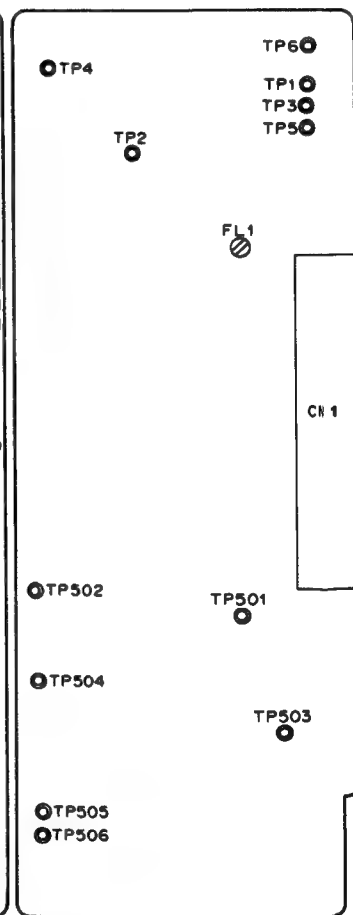
<ul style="list-style-type: none"> Input signal: Color-bar Insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP4;AFM-6/6P
- Adj. point : Sync tip carrier adjustment
 ●RV7 (CARRIER SET OXIDE);AFM-6/6P
- Spec. : Sync tip carrier adjustment
 Set the left side peak level to 4.4MHz.



AFM-6/6P BOARD (SOLDERING SIDE)



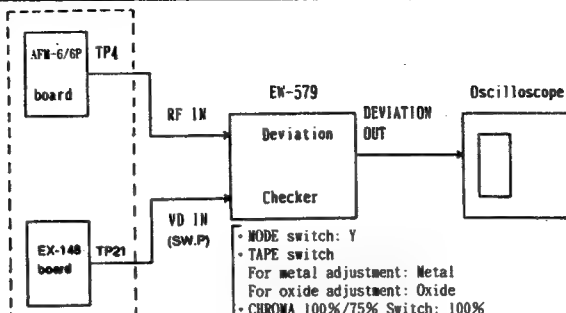
AFM-6/6P BOARD (COMPONENT SIDE)

2) Adjustment Using Deviation Checker

• Setting

Equipment: Dual Trace Oscilloscope	Board: AFM-6/6P board
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• Connection

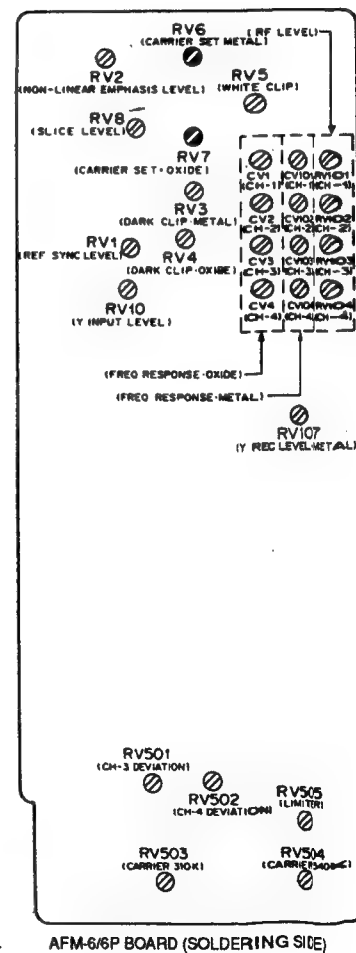
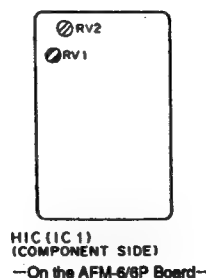
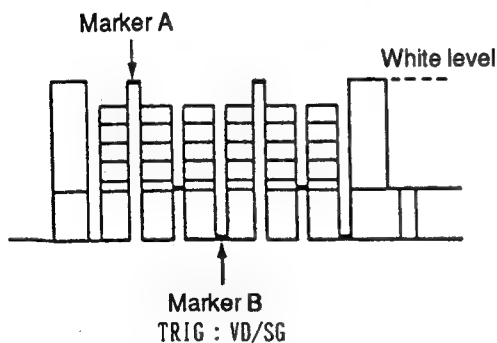


• Preparation

- Built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.
- After metal adjustment is completed, insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

- Test point : DEVIATION OUT (DEVIATION CHECKER)
- Adj. point : • METAL
Marker B adjustment (CARRIER SETTING)
● RV6 (CARRIER SET METAL);AFM-6/6P
Marker A adjustment (DEVIATION)
● RV1 (IC1);AFM-6/6P
- OXIDE
Marker B adjustment (CARRIER SETTING)
● RV7 (CARRIER SET OXIDE);AFM-6/6P
- Spec. : Procedure
1. Set marker B to the sync tip level.
2. Set marker A to the white peak level.
3. Set oxide marker B to the sync tip level.



8-5-20. Y Dark Clip Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

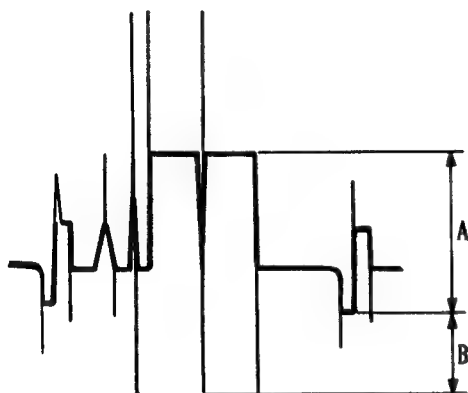
Board: AFM-6/6P board

• Preparation

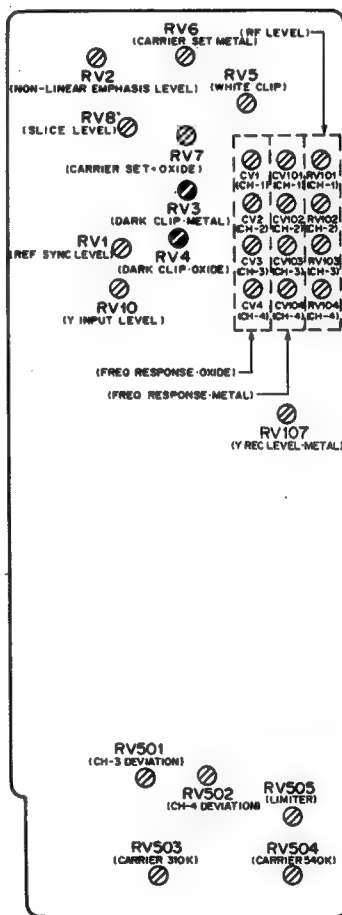
- Input signal: MOD pulse & bar
- Metal: Insert the BCT-20M and put the unit into the REC mode.
- Oxide: Insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

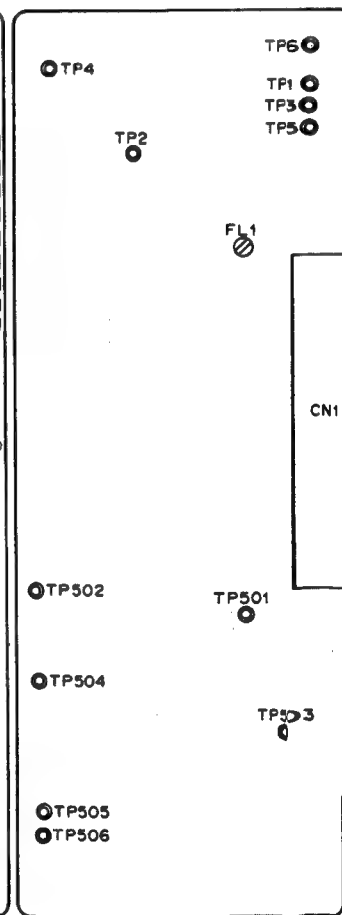
- Test point : TP2;AFM-6/6P
- Adj. point :
 - RV3 (DARK CLIP METAL)
 - RV4 (DARK CLIP OXIDE)
- Spec. :
 - A = VS level
 - A = 100% (reference)
 - For NTSC : B = $100 \pm 2.5\%$ (METAL)
 - B = $60 \pm 2.5\%$ (OXIDE)
 - For PAL : B = $150 \pm 2.5\%$ (METAL)
 - B = $65 \pm 2.5\%$ (OXIDE)



TRIG : HD/SG



AFM-6/6P BOARD (SOLDERING SIDE)



AFM-6/6P BOARD (COMPONENT SIDE)

8-5-21. Y White Clip Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

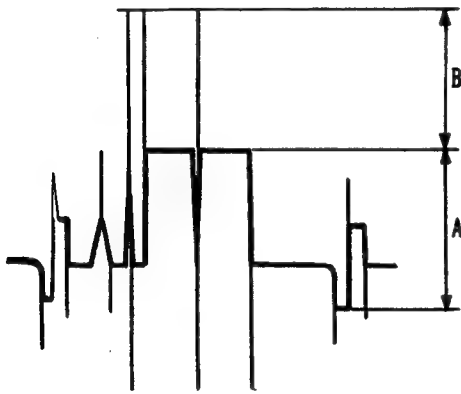
Board: AFM-6/6P board

• Preparation

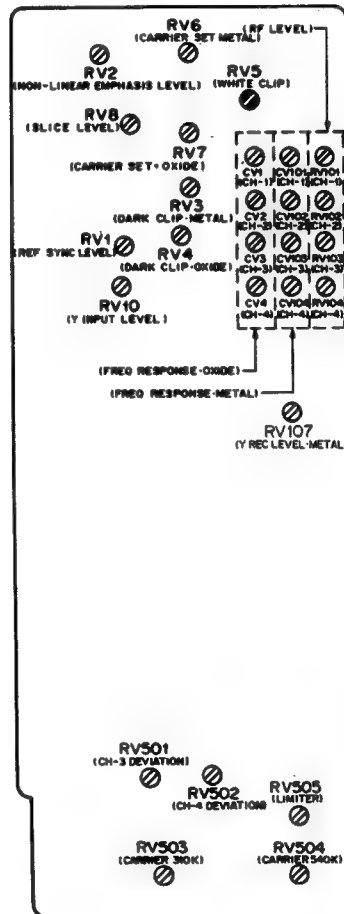
- Input signal: MOD pulse and bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

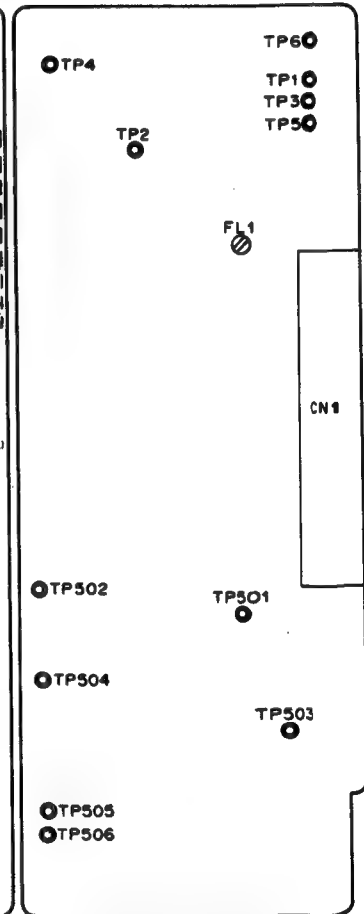
- Test point : TP2;AFM-6/6P
- Adj. point : ● RV5 (WHITE CLIP);AFM-6/6P
- Spec. : A = VS level
A = 100% (reference)
For NTSC : B = $130 \pm 2.5\%$
For PAL : B = $150 \pm 2.5\%$



TRIG : HD/SG



AFM-6/6P BOARD (SOLDERING SIDE)



AFM-6/6P BOARD (COMPONENT SIDE)

8-5-22. Y Nonlinear Emphasis Level Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

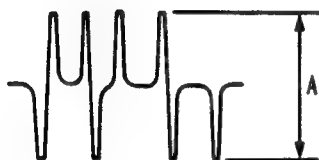
Board: AFM-6/6P board

• Preparation

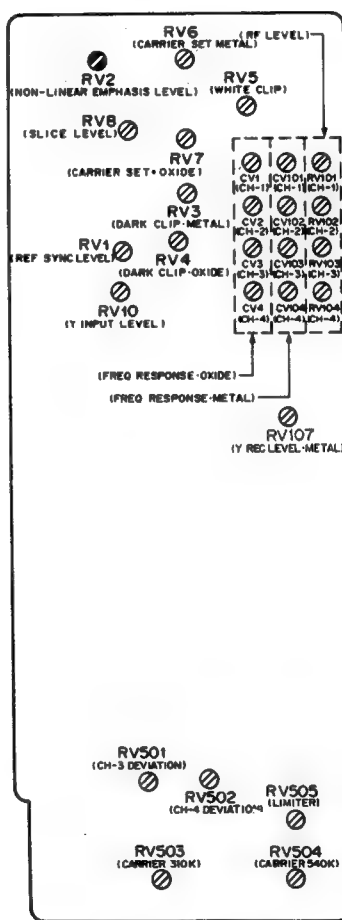
- Input signal: MOD pulse and bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

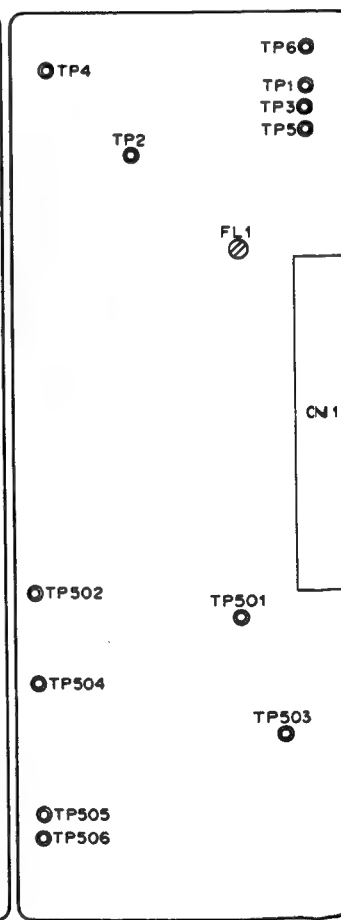
- Test point : TP3;AFM-6/6P
- Adj. point : ● RV2 (NON-LINEAR EMPHASIS);AFM-6/6P
- Spec. : For NTSC : $A = 100 \pm 2\text{mV}$
For PAL : $A = 90 \pm 2\text{mV}$



TRIG : HD/SG



AFM-6/6P BOARD (SOLDERING SIDE)



AFM-6/6P BOARD (COMPONENT SIDE)

8-5-23. Y REC HF Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

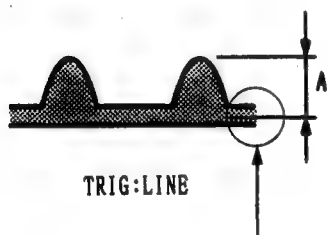
Board: AFM-6/6P board

• Preparation

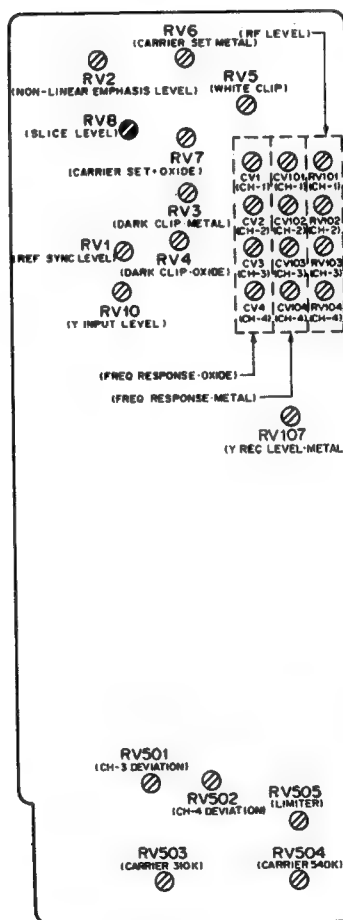
- Y input signal: H sweep {Sweep signal 115IRE (for NTSC) and 820 mV (for PAL) and sync signal 40IRE (for NTSC) and 286 mV (for PAL) with 75-ohms termination}
- TP9/Extension board: AFM-6/6P
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

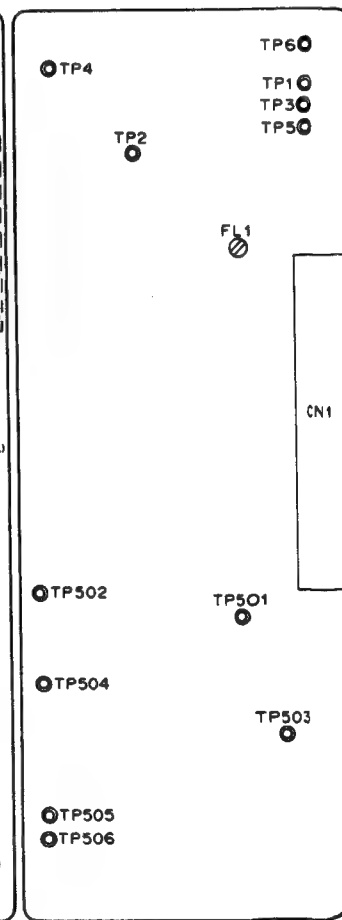
- Test point : TP6;AFM-6/6P
- Adj. point : ● RV8 (SLICE LEVEL);AFM-6/6P
- Spec. : $A = 150 \pm 5\text{mV}$



Measured at the waveform center.



AFM-6/6P BOARD (SOLDERING SIDE)



AFM-6/6P BOARD (COMPONENT SIDE)

8-5-24. Y MOD Carrier Balance Adjustment

• Setting

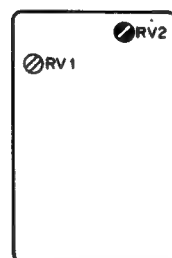
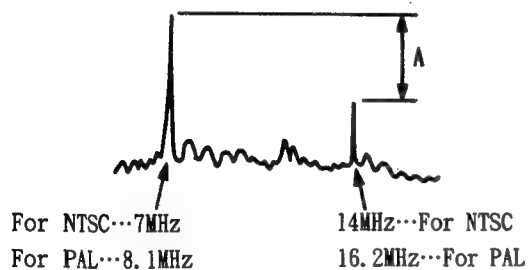
Equipment: Spectrum Analyzer	Board: AFM-6/6P board
------------------------------	-----------------------

• Preparation

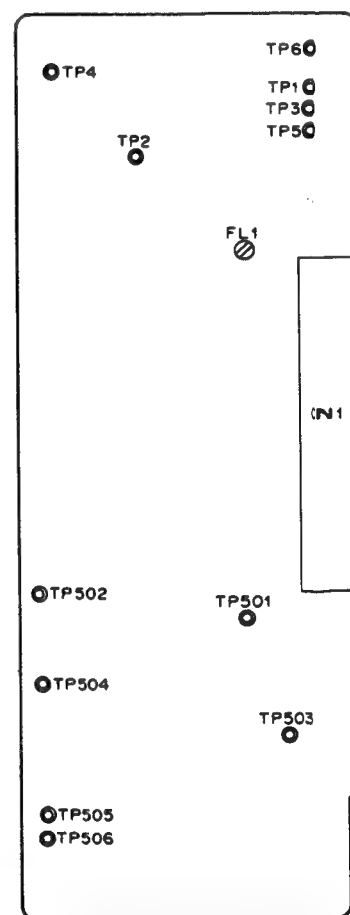
- Input signal: 50% flat field
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP4;AFM-6/6P
- Adj. point :  RV2 (NON-LINEAR EMPHASIS LEVEL);AFM-6/6P
- Spec. : Minimize the level at 14MHz for NTSC and 16.2MHz for PAL.
(A = 40dB or more)



HIC (IC 1)
(COMPONENT SIDE)
—On the AFM-6/6P Board—



AFM-6/6P BOARD (COMPONENT SIDE)

8-5-25. Y REC Current Tentative Adjustment (Oxide)

• Setting

Equipment: Dual Trace Oscilloscope

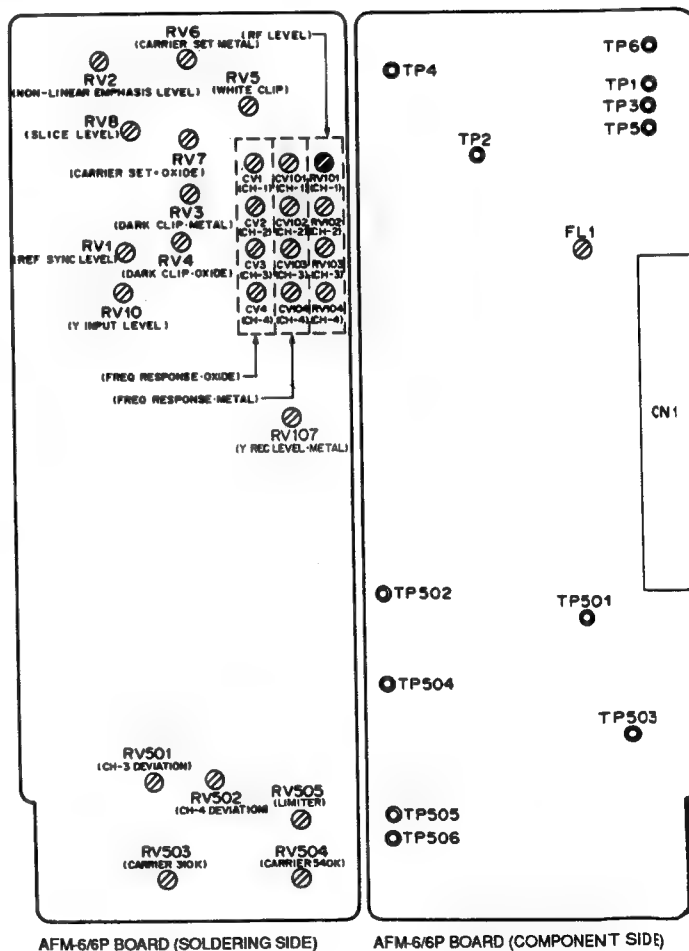
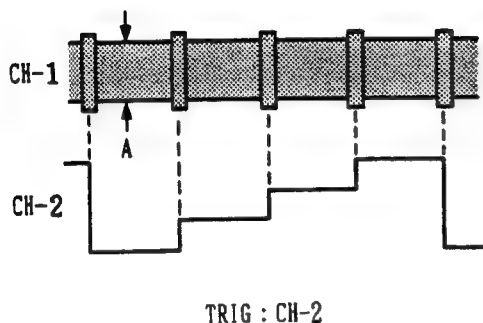
Board: AFM-6/6P board

• Preparation

- Input signal: 50% flat field
- Insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

- Test point : CH1: TP32;Extension board (AFM-6/6P)
CH2: TP7;Extension board (AFM-6/6P)
- Adj. point : ● RV101 (CH-1 RF LEVEL);AFM-6/6P
- Spec. : $A = 800 \pm 20\text{mV}$

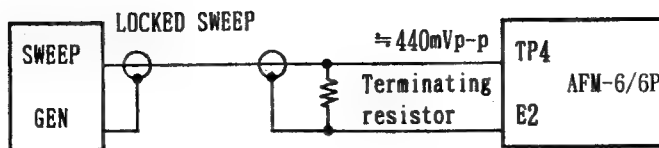


8-5-26. Y REC Current Frequency Response Adjustment (Oxide)

• Setting

Equipment: Dual Trace Oscilloscope	Board: AFM-6/6P board
------------------------------------	-----------------------

• Connection



• Preparation

- Remove short-housing CNJ2 on the AFM-6/6P board, connect the Sweep Signal Generator between TP4 on the AFM-6/6P board and E2 on the AFM-6/6P board and supply a locked sweep signal.
- Insert the BCT-20G and put the unit into the REC PAUSE mode.
- After adjustment is completed, install short-housing CNJ2.

• Adjustment procedures

- Test point : CH-1 : TP32;Extension board
CH-2 : TP7;Extension board

- TRIG : CH-2

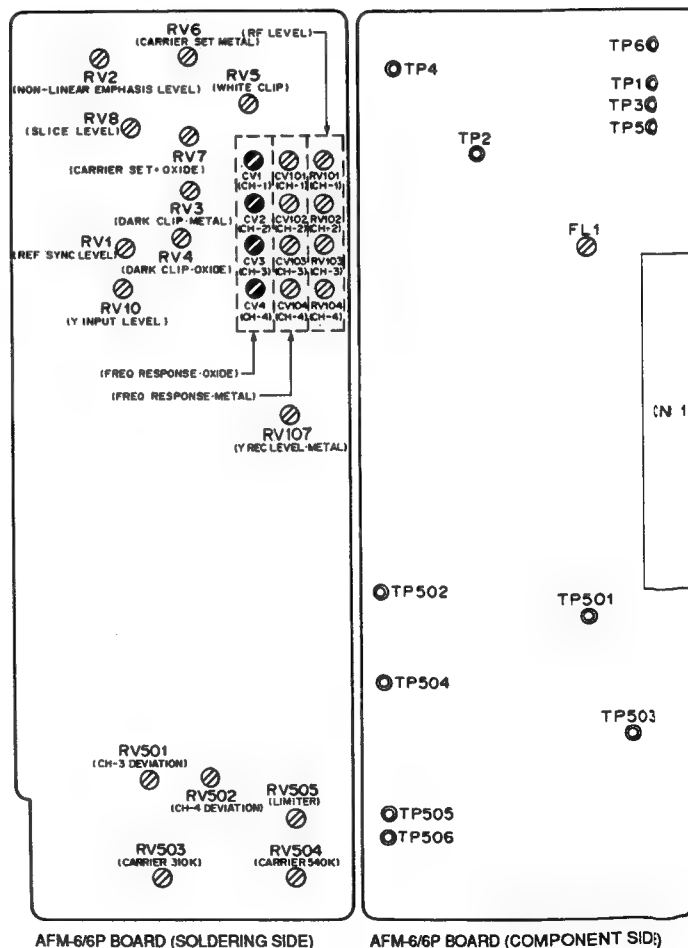
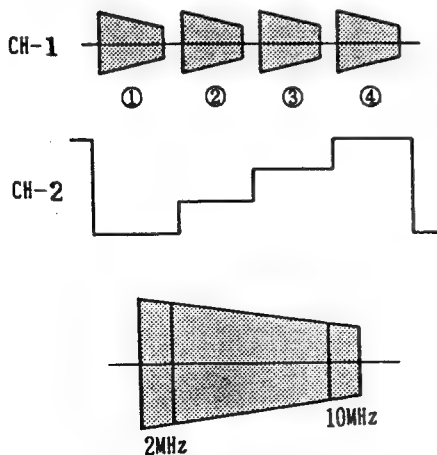
- Adj. point : ① : CV1 (CH-1);AFM-6/6P
② : CV2 (CH-2);AFM-6/6P
③ : CV3 (CH-3);AFM-6/6P
④ : CV4 (CH-4);AFM-6/6P

- Spec. : For NTSC

frequency	level
2 MHz	100% reference
10 MHz	90 \pm 5 %

For PAL

frequency	level
2 MHz	100% reference
10 MHz	90 \pm 10%



AFM-6/6P BOARD (SOLDERING SIDE)

AFM-6/6P BOARD (COMPONENT SIDE)

8-5-27. Y REC Current Adjustment (Oxide)

Step 1.

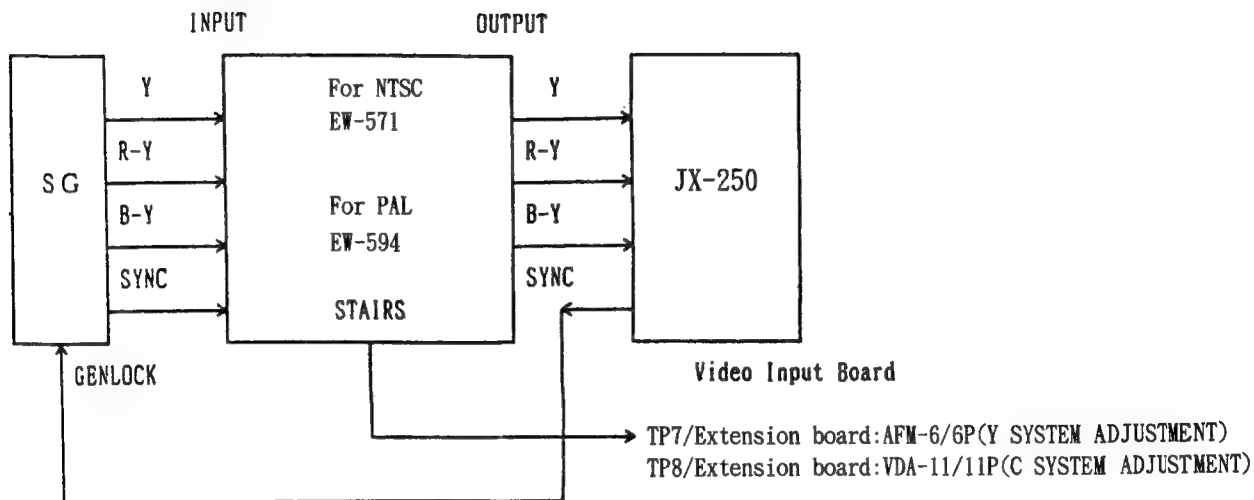
• Setting

Equipment: Dual Trace Oscilloscope

Board: AFM-6/6P board

• Connection

REC CURRENT ADJ. TOOL

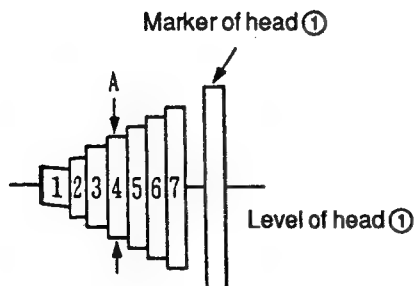


• Preparation

- Remove short-housing CNJ2 on the AFM-6/6P board and connect the RF OUT connector of the REC Current Adjustment Tool between TP4 on the AFM-6/6P board and E2 on the AFM-6/6P board.
- Insert the BCT-20G and put the unit into the REC PAUSE mode.
- Adjustment Tool:
 AUTO/MANU → AUTO
 NTSC/PAL → NTSC (For NTSC) or PAL (For PAL)
 Y/C → Y
 METAL/OXIDE → OXIDE

• Adjustment procedures

- Test point : TP32;Extension board: AFM-6/6P
- Adj. point : RF LEVEL VR/REC CURRENT ADJUSTMENT TOOL
- Spec. : $A = 800 \pm 10\text{mV}$
(Fourth level)



Step 2.

• Setting

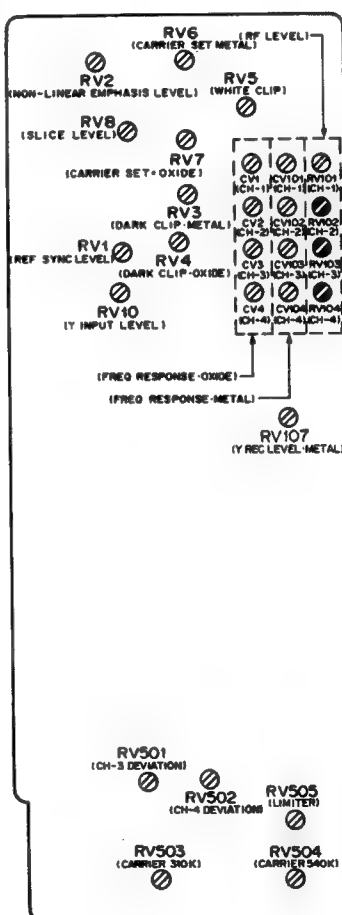
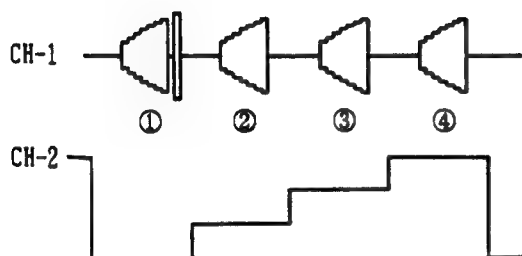
Equipment: Dual Trace Oscilloscope	Board: AFM-6/6P board
------------------------------------	-----------------------

• Preparation

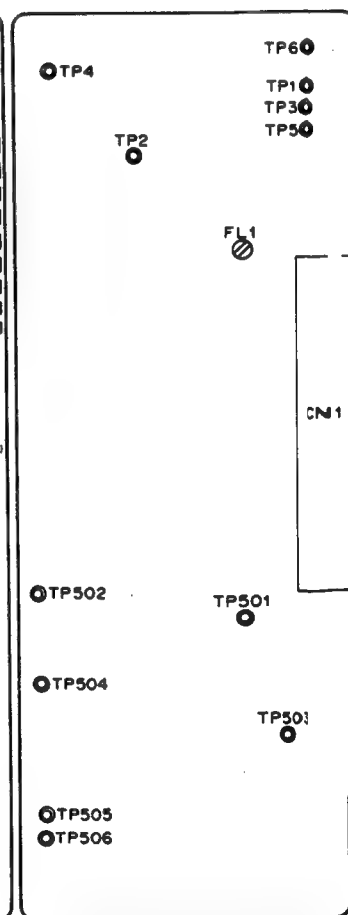
- Remove short-housing CNJ2 on the AFM-6/6P board and connect the RF OUT connector of the REC Current Adjustment Tool between TP4 on the AFM-6/6P board and E2 on the AFM-6/6P board.
- Put the unit into the REC mode and record the signal on the tape.

• Adjustment procedures

- Test point : CH-1 : TP32;Extension board
CH-2 : TP7;Extension board
- Adj. point : HEAD② : ● RV102 (CH-2);AFM-6/6P
HEAD③ : ● RV103 (CH-3);AFM-6/6P
HEAD④ : ● RV104 (CH-4);AFM-6/6P
- Spec. :
- Adjust so that the specified level is the same as in Step 1.



AFM-6/6P BOARD (SOLDERING SIDE)



AFM-6/6P BOARD (COMPONENT SIDE)

Step 3

• Setting

Equipment: Dual Trace Oscilloscope

Board: VP-24/24P board

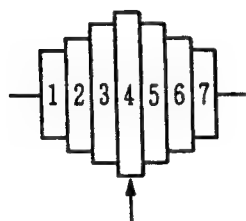
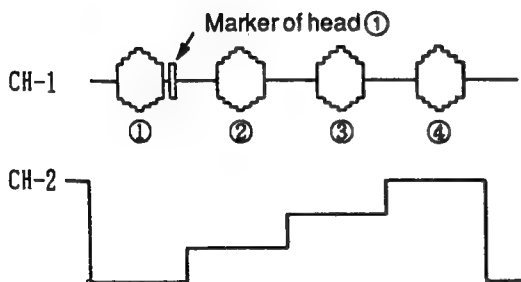
• Preparation

- Remove short-housing CNJ2 on the AFM-6/6P board and connect the RF OUT connector of the REC Current Adjustment Tool between TP4 on the AFM board and E2 on the AFM-6/6P board.

• Adjustment procedures

- Test point : CH-1 : TP33; Extension board : VP-24/24P
CH-2 : TP25; Extension board : VP-24/24P

- Spec :



Check the maximum PB RF level.

* The illustrated fourth level is maximum.

1. Play back the recorded portion in step 2.
2. Memorize the maximum level for every four heads (① through ④).

Step 4.

• Setting

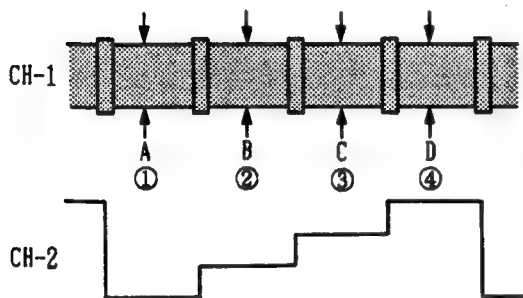
Equipment: Dual Trace Oscilloscope	Board: AFM-6/6P board
------------------------------------	-----------------------

• Preparation

- Remove short-housing CNJ2 on the AFM-6/6P board and connect the RF OUT connector of the REC Current Adjustment Tool between TP4 on the AFM-6/6P board and E2 on the AFM-6/6P board.
- Input signal: 50% flat field
- Insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

- Test point : CH-1 : TP32;Extension board
CH-2 : TP7;Extension board
- Adj. point : HEAD① : ● RV101 (CH-1);AFM-6/6P
HEAD② : ● RV102 (CH-2);AFM-6/6P
HEAD③ : ● RV103 (CH-3);AFM-6/6P
HEAD④ : ● RV104 (CH-4);AFM-6/6P
- Spec. : Adjust the voltage so that A, B, C, and D correspond to the maximum levels memorized in Step 3.



For NTSC

[Correspondence Table]

1	2	3	4	5	6	7
630	690	750	800	865	930	980

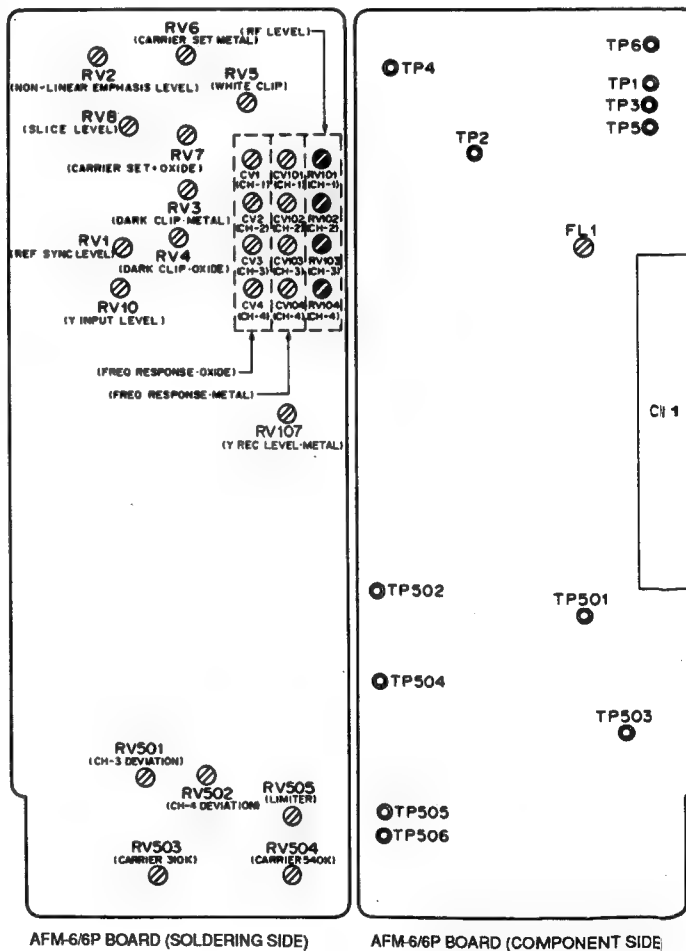
(mVp-p)

For PAL

[Correspondence Table]

1	2	3	4	5	6	7
630	690	750	800	865	930	980

(mVp-p)



AFM-6/6P BOARD (SOLDERING SIDE)

AFM-6/6P BOARD (COMPONENT SIDE)

8-5-28. Y Frequency Response Check (Oxide)

• Setting

Equipment: Waveform Monitor	Board:
-----------------------------	--------

• Preparation

- Calculate the calibration value on the standard player (equivalent to BVW-75/75P).
Calibration Value = (Chart 1) - (CR5-2A playback level For NTSC)
(CR5-2APS playback level ... For PAL)

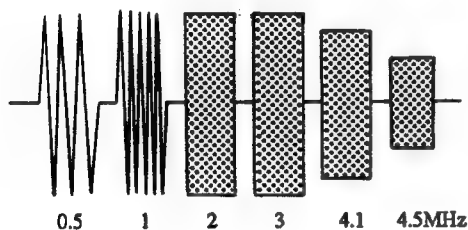
	NTSC	PAL
1 MHz	100%	100%
2 MHz	97%	100%
3 MHz	92%	100%
4.1 MHz	86%	70%

Chart 1

- Input signal: Multi burst signal
- Insert the blank tape (BCT-20G) to BVW-D600/D600P.
Then put the unit into the REC mode about 120 seconds.

• Adjustment procedures

CAV Y OUT/BVW-75/75P (or equivalent)



Specification

	NTSC	PAL
frequency	level	level
0.5 MHz	100% (REFERENCE)	100% (REFERENCE)
1 MHz	(100-Calibration value) $\pm 5\%$	(100-Calibration value) $\pm 5\%$
2 MHz	(100-Calibration value) $+5\%$ -7.5%	(98-Calibration value) $+5\%$ -7.5%
3 MHz	(95-Calibration value) $+7.5\%$ -10%	(90-Calibration value) $+5\%$ -10%
4.1 MHz	(85-Calibration value) $+10\%$ -15%	(73-Calibration value) $+5\%$ -18%

Measure the levels at the center of moire.

The level differences between the fields at 3 MHz should be within 5% respectively.

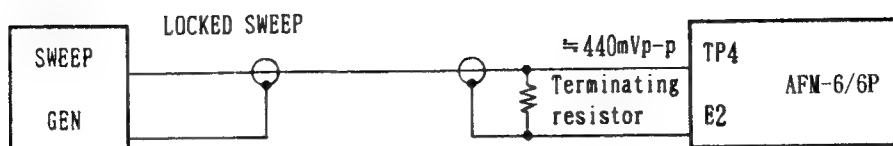
Repeat 8-5-24. Y REC current frequency response adjustment (Oxide) and 8-5-25. Y REC current adjustment (Oxide) so that the specification is met.

8-5-29. Y REC Current Frequency Response Adjustment (Metal)

• Setting

Equipment: Dual Trace Oscilloscope	Board: AFM-6/6P board
------------------------------------	-----------------------

• Connection



• Preparation

- Remove short-housing CNJ2 on the AFM-6/6P board, connect the Sweep Signal Generator between TP4 on the AFM-6/6P board and E2 on the AFM-6/6P board, and supply a locked sweep signal.
- Insert the BCT-20M and put the unit into the REC mode.
- After adjustment is completed, install short-housing CNJ2.

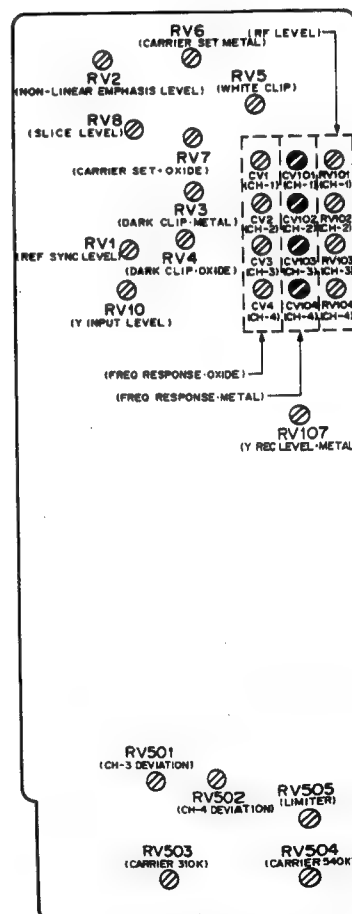
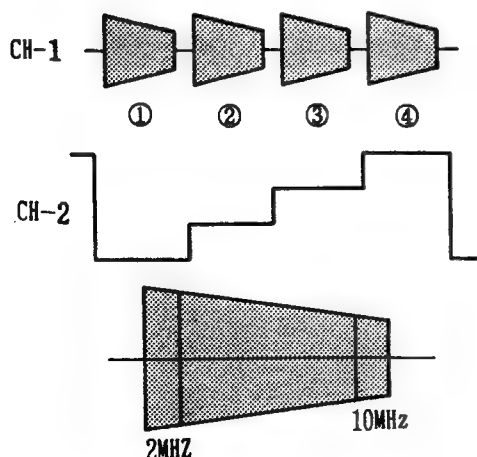
• Adjustment procedures

- Test point : CH-1 : TP32;Extension board
CH-2 : TP7;Extension board
- TRIG : CH-2
- Adj. point : ① ● CV101 (CH-1);AFM-6/6P
② ● CV102 (CH-2);AFM-6/6P
③ ● CV103 (CH-3);AFM-6/6P
④ ● CV104 (CH-4);AFM-6/6P
- Spec. : For NTSC

frequency	level
2 MHz	100% reference
10 MHz	85 \pm 5 %

: For PAL

frequency	level
2 MHz	100% reference
10 MHz	95 \pm 5 %



AFM-6/6P BOARD (SOLDERING SIDE)

8-5-30. Y REC Current Adjustment (Metal)

• Setting

Equipment: Dual Trace Oscilloscope	Board: AFM-6/6P board
------------------------------------	-----------------------

• Preparation

- Input signal: 50% flat field
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : CH-1 : TP32;Extension board
CH-2 : TP7;Extension board
- Adj. point : ● RV107 (Y REC LEVEL METAL);AFM-6/6P
- Spec. : Adjust so that A is two times as high as the level of head ① which is set in Step 4 of Sec. 8-5-27. Y REC Current Adjustment (Oxide).

Note: Make sure that the level ① through ④ are not exceed 1.6V respectively.

8-5-31. Y Frequency Response Check (Metal)

• Setting

Equipment: Waveform Monitor	Board:
-----------------------------	--------

- Calculate the calibration value on the standard player (equivalent to BVW-75/75P).
Calibration Value = (Chart 1) - (CR5-1B playback level For NTSC)
(CR5-1BPS playback level ... For PAL)
- Input signal: Multi burst signal
- Insert the blank tape (BCT-20M) to BVW-D600/D600P. Then put the unit into the REC mode about 120 seconds.

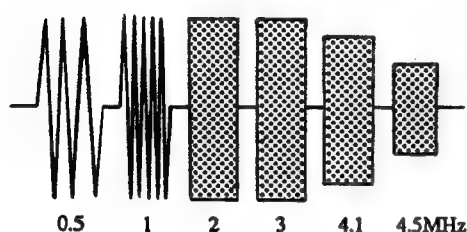
NTSC		PAL	
1 MHz	100%	1 MHz	100%
2 MHz	100%	2 MHz	100%
3 MHz	100%	4 MHz	100%
4.1 MHz	100%	5 MHz	100%
4.5 MHz	86%	5.5 MHz	80%

Chart 1

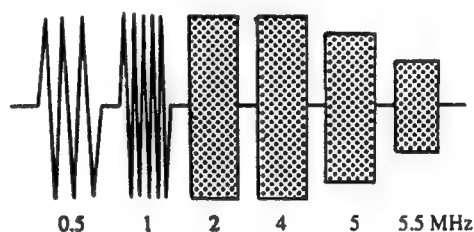
• Adjustment procedures

CAV Y OUT/BVW-75/75P (or equivalent)

(For NTSC)



(For PAL)



Specification (For NTSC)

frequency	level
0.5 MHz	100% (REFERENCE)
1 MHz	(100-Calibration value) $\pm 5\%$
2 MHz	(100-Calibration value) $\pm 5\%$
3 MHz	(100-Calibration value) $+2.5\%$ -7.5%
4.1 MHz	(95-Calibration value) $+5\%$ -7.5%
4.5 MHz	(80-Calibration value) $+10\%$ -15%

Specification (For PAL)

frequency	level
0.5 MHz	100% (REFERENCE)
1 MHz	(100-Calibration value) $\pm 5\%$
2 MHz	(100-Calibration value) $\pm 5\%$
4 MHz	(100-Calibration value) $+2.5\%$ -7.5%
5 MHz	(100-Calibration value) $+5\%$ -7.5%
5.5 MHz	(85-Calibration value) $+10\%$ -15%

Measure the levels at the center of moire.

For NTSC

- The level differences between the fields at 4.1 MHz should be within 5% respectively.

For PAL

- The level differences between the fields at 5 MHz should be within 5% respectively.

Repeat 8-5-27. Y REC current frequency response adjustment (METAL) and 8-5-28. Y REC current adjustment (METAL) so that the specification is met.

8-5-32. C REC Current Tentative Adjustment (Oxide)

• Setting

Equipment: Dual Trace Oscilloscope

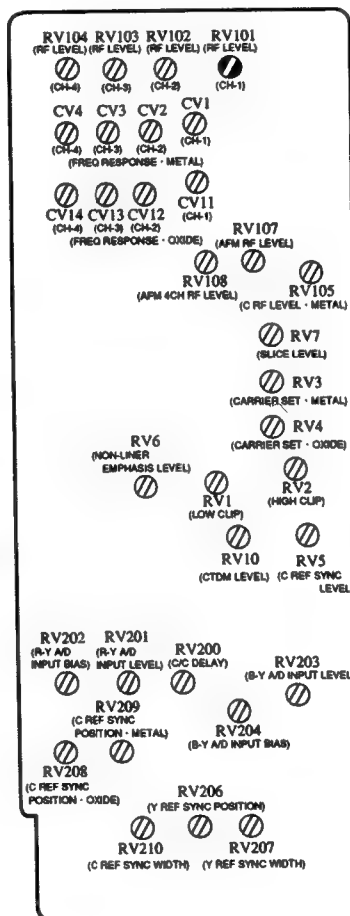
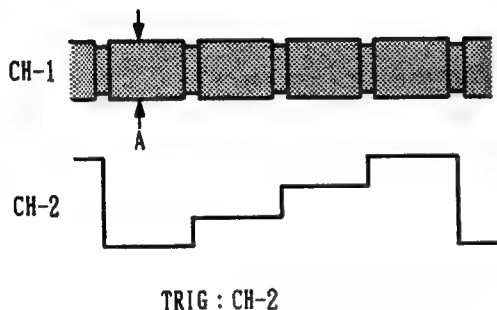
Board: VDA-11/11P board

• Preparation

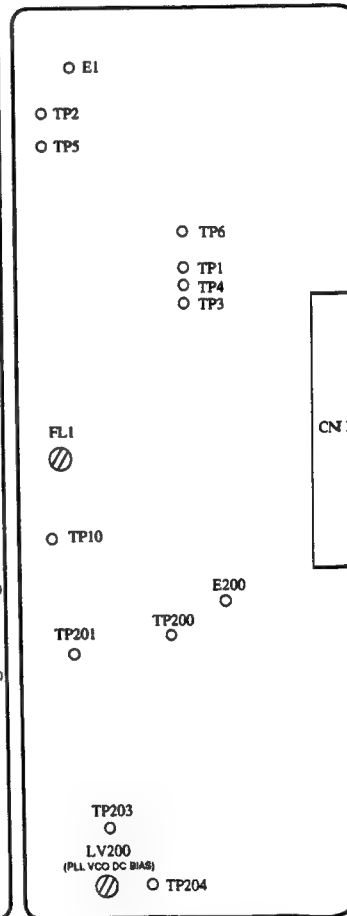
- Input signal: 0% flat field
- Insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

- Test point : CH-1 : TP46;Extension board
CH-2 : TP8;Extension board
- Adj. point : ● RV101 (CH-1 RF LEVEL)
;VDA-11/11P
- Spec. : A = $400 \pm 10 \text{mV}$



VDA-11/P BOARD(SOLDERING SIDE)



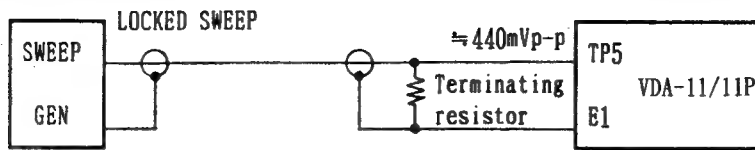
VDA-11/P BOARD(COMPONENT SIDE)

8-5-33. C REC Current Frequency Response Adjustment (Oxide)

• Setting

Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
------------------------------------	-------------------------

• Connection



• Preparation

- Remove short-housing CNJ2 on the VDA-11/11P board, connect the Sweep Signal Generator between TP5 on the VDA-11/11P board and E1 on the VDA-11/11P board, and supply a locked sweep signal.
- Insert the BCT-20G and put the unit into the REC PAUSE mode.

• Adjustment procedures

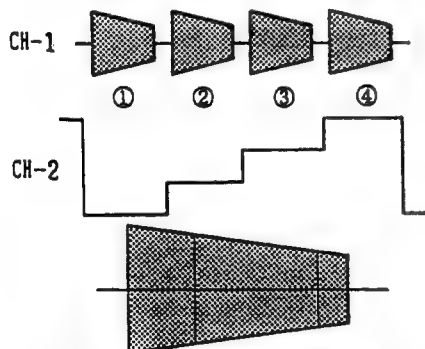
- Test point : CH-1 : TP46/Extension board
CH-2 : TP8/Extension board
- TRIG : CH-2
- Adj. point : CH-1 : CV11 (CH-1);VDA-11/11P
CH-2 : CV12 (CH-2);VDA-11/11P
CH-3 : CV13 (CH-3);VDA-11/11P
CH-4 : CV14 (CH-4);VDA-11/11P

• Spec. : For NTSC

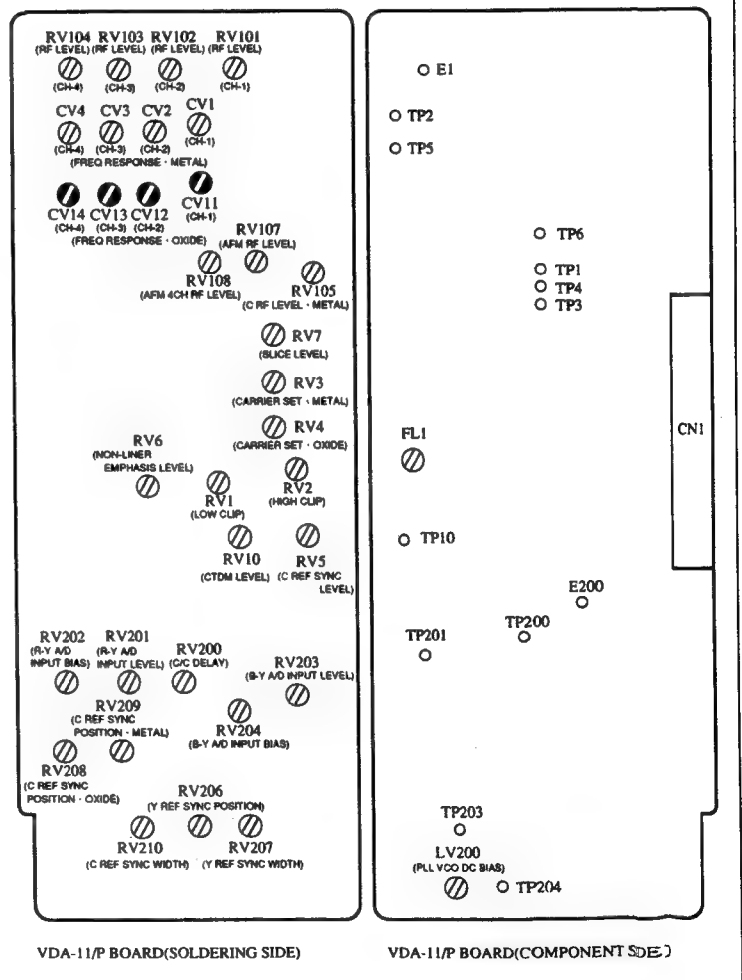
frequency	level
4.08 MHz	100% reference
10 MHz	50±10%

: For PAL

frequency	level
3.93 MHz	100% reference
10 MHz	60±10%



For NTSC ... 4.08MHz 10MHz ... For NTSC
For PAL ... 3.93MHz 10MHz ... For PAL



• Note

- After adjustment is completed, install short-housing CNJ2.

8-5-34. C REC Current Adjustment (Oxide)

Step 1.

• Setting

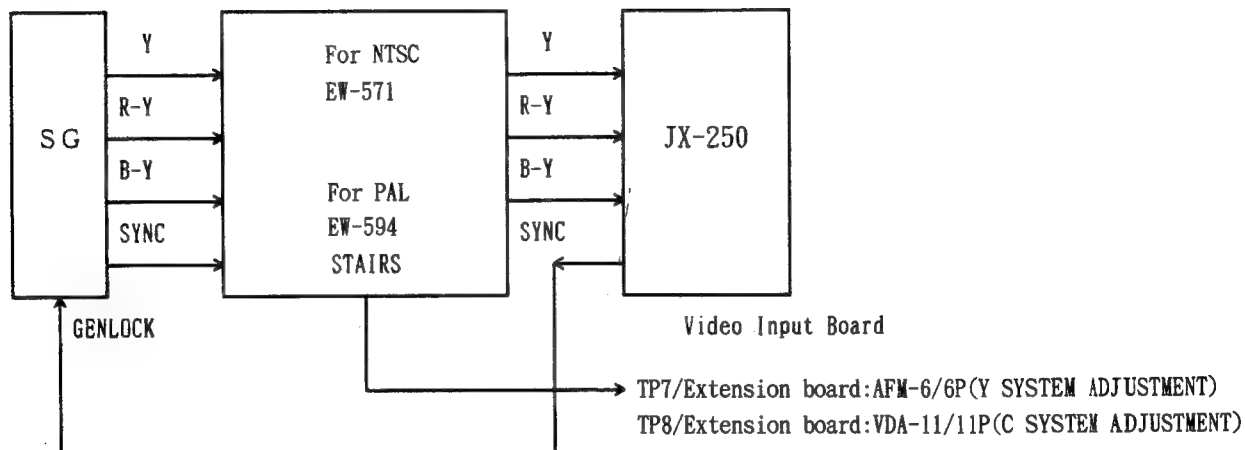
Equipment: Dual Trace Oscilloscope

Board: VDA-11/11P board

• Connection

REC CURRENT ADJ. TOOL INPUT

OUTPUT

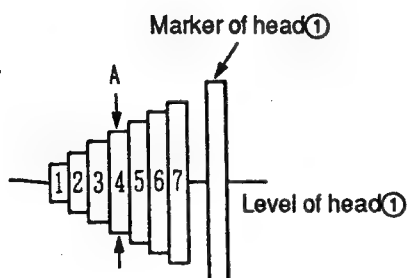


• Preparation

- Remove short-housing CNJ2 on the VDA-11/11P board and connect the RF OUT connector of the REC Current Adjustment Tool between TP5 on the VDA-11/11P board and E1 on the VDA-11/11P board.
- Insert the BCT-20G and put the unit into the REC PAUSE mode.
- Adjustment tool:
 AUTO/MANU→AUTO
 NTSC/PAL→NTSC (For NTSC) or PAL (For PAL)
 Y/C→C
 METAL/OXIDE→OXIDE

• Adjustment procedures

- Test point : TP46;Extension board
- Adj. point : RF LEVEL VR/REC
Current Adjustment Tool
- Spec. : $A = 400 \pm 10\text{mV}$
(Fourth level)



Step 2.

• Setting

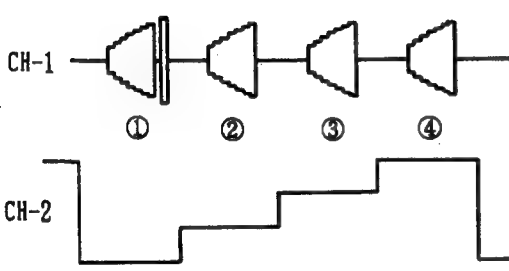
Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
------------------------------------	-------------------------

• Preparation

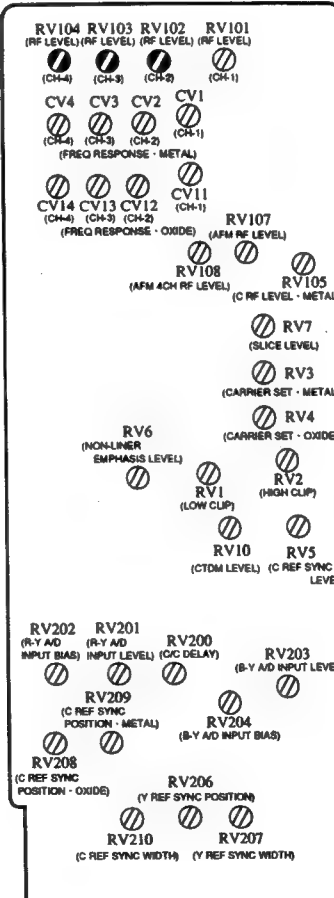
- Remove short-housing CNJ2 on the VDA-11/11P board and connect the RF OUT connector of the REC Current Adjustment Tool between TP5 on the VDA-11/11P board and E1 on the VDA-11/11P board.

• Adjustment procedures

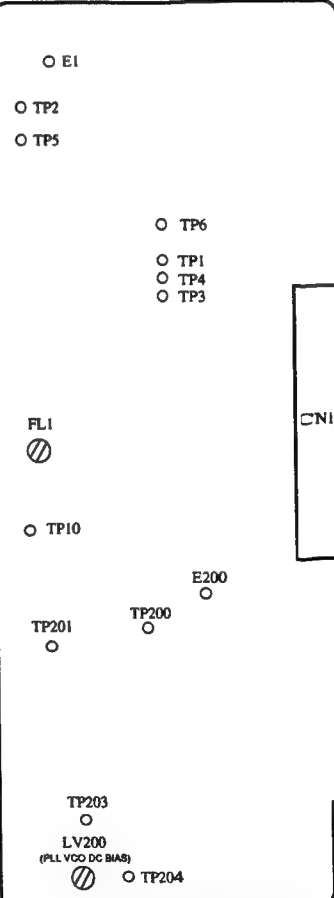
- Adjust so that the specified level is the same as in Step 1.
- Test point : CH-1 : TP46;Extension board
CH-2 : TP8;Extension board
- Adj. point : HEAD ② : ● RV102 (CH-2);VDA-11/11P
HEAD ③ : ● RV103 (CH-3);VDA-11/11P
HEAD ④ : ● RV104 (CH-4);VDA-11/11P



- After adjustment is completed, put the unit into the REC mode and record the signal in the tape.



VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

Step 3.

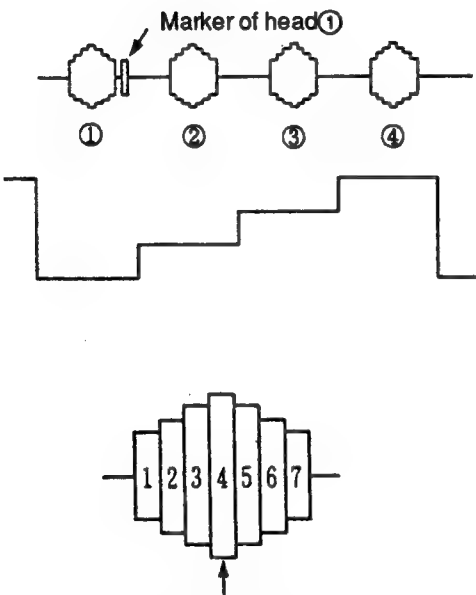
• Setting

Equipment: Dual Trace Oscilloscope	Board: VP-24/24P board
------------------------------------	------------------------

• Preparation

- Remove short-housing CNJ2 on the VDA-11/11P board and connect the RF OUT connector of the REC Current Adjustment Tool between TP5 on the VDA-11/11P board and E1 on the VDA-11/11P board.

• Adjustment procedures

- Test point : CH-1 : TP31;Extension board: VP-24/24P
CH-2 : TP25;Extension board: VP-24/24P
 - Spec. :
- 

Marker of head ①

① ② ③ ④

1 2 3 4 5 6 7
- Check the maximum PB RF level.
* The illustrated fourth level is maximum.
1. Play back the recorded portion in Step 2.
 2. Memorize the maximum level for every four heads (① through ④)
 3. After adjustment is completed, install short-housing CNJ2.

Step 4.

• Setting

Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
------------------------------------	-------------------------

• Preparation

- Remove short-housing CNJ2 on the VDA-11/11P board and connect the RF OUT connector of the REC Current Adjustment Tool between TP5 on the VDA-11/11P board and E1 on the VDA-11/11P board.
- Input signal: 0% flat field
- Insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

- Test point : CH-1 : TP46;Extension board

CH-2 : TP8;Extension board

- Adj. point : HEAD① : ● RV101 (CH-1)

;VDA-11/11P

HEAD② : ● RV102 (CH-2)

;VDA-11/11P

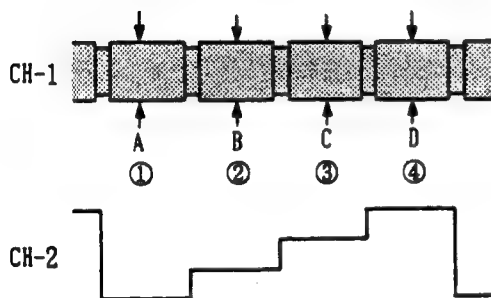
HEAD③ : ● RV103 (CH-3)

;VDA-11/11P

HEAD④ : ● RV104 (CH-4)

;VDA-11/11P

- Spec. : Adjust the voltage so that A, B, C, and D correspond to the maximum levels memorized in Step 3.



For NTSC

[Correspondence Table]

1	2	3	4	5	6	7
310	340	370	400	430	475	500

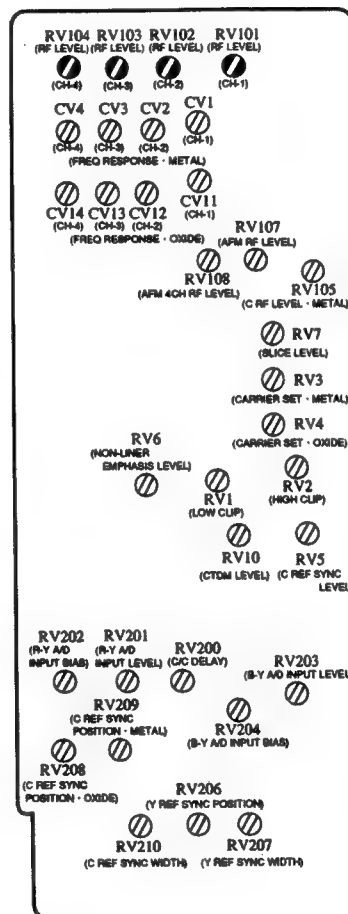
(mVp-p)

For PAL

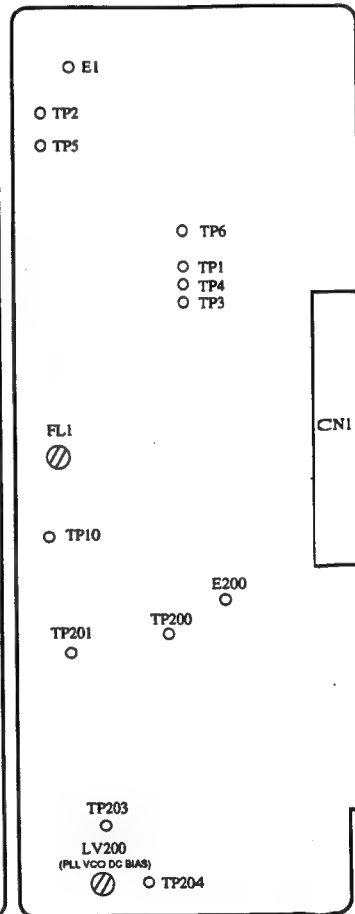
[Correspondence Table]

1	2	3	4	5	6	7
310	340	370	400	430	475	500

(mVp-p)



VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

8-5-35. C Frequency Response Check (Oxide)

• Setting

Equipment: Waveform Monitor	Board:
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• Preparation

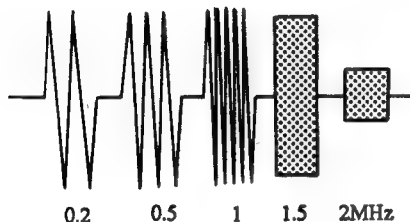
- Calculate the calibration value on the standard player (equivalent to BVW-75/75P).
Calibration Value = (Chart 1) - (CR5-2A playback level For NTSC)
(CR5-2APS playback level For PAL)
- Input signal: Multi burst signal
- Insert the blank tape (BCT-20G) to BVW-D600/D600P. Then put the unit into REC mode about 90 seconds.

	NTSC	PAL
0.5 MHz	100%	100%
1 MHz	97%	100%
1.5 MHz	86%	85%

Chart 1

• Adjustment procedures

CAV R-Y OUT/BVW-75/75P (or equivalent)
CAV B-Y OUT/BVW-75/75P (or equivalent)



Specification

	NTSC	PAL
frequency	level	level
0.2 MHz	100% (REFERENCE)	100% (REFERENCE)
0.5 MHz	(100-Calibration value) $\pm 5\%$	(100-Calibration value) $\pm 5\%$
1 MHz	(100-Calibration value) $\pm 5\%$	(100-Calibration value) $\pm 5\%$
1.5 MHz	(85-Calibration value) $\pm 5\%$	(85-Calibration value) $\pm 5\%$

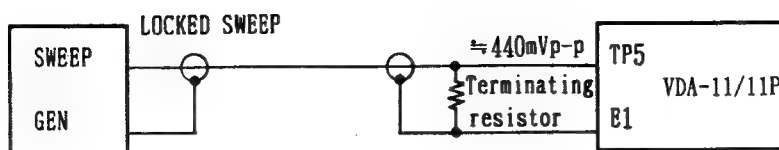
- The level differences between the fields at 1.5 MHz should be within 7.5% respectively.
- Repeat 8-5-33. C REC current frequency response adjustment (Oxide) and 8-5-34. C REC current adjustment (Oxide) so that the specification is met.

8-5-36. C REC Current Frequency Response Adjustment (Metal)

• Setting

Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
------------------------------------	-------------------------

• Connection



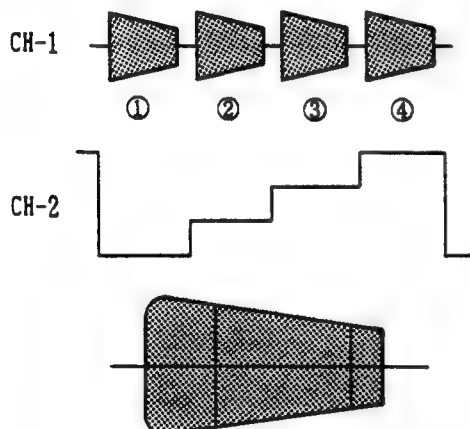
• Preparation

- Remove short-housing CNJ2 on the VDA-11/11P board, connect the Sweep Signal Generator between TP5 on the VDA-11/11P board and E1 on the VDA-11/11P board, and supply a locked sweep signal.
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : CH-1 : TP46;Extension board
CH-2 : TP8;Extension board
- TRIG : CH-2
- Adj. point : ① : CV1 (CH-1);VDA-11/11P
② : CV2 (CH-2);VDA-11/11P
③ : CV3 (CH-3);VDA-11/11P
④ : CV4 (CH-4);VDA-11/11P

• Spec.



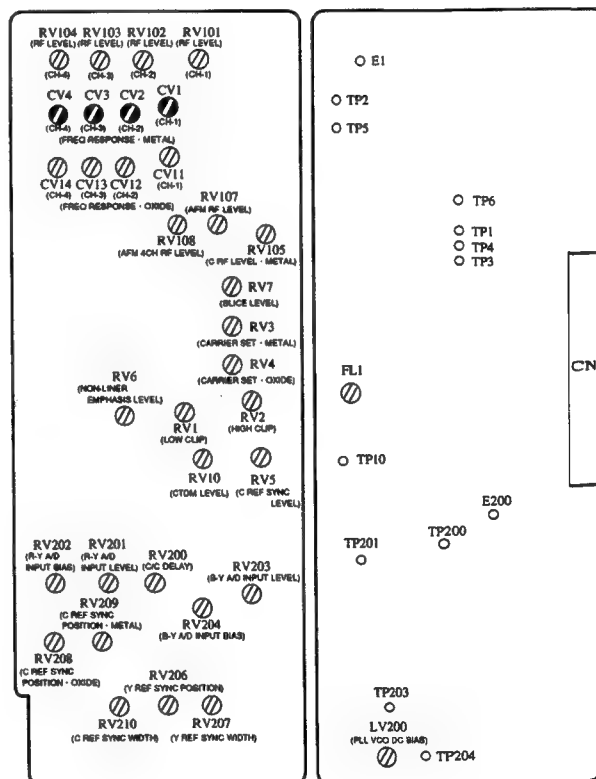
For NTSC ... 4.08MHz 10MHz
For PAL ... 3.93MHz 10MHz

For NTSC

frequency	level
4.08 MHz	100% reference
10 MHz	55±10%

For PAL

frequency	level
3.93 MHz	100% reference
10 MHz	65 +10 -15 %



• Note

- After adjustment is completed, install short-housing CNJ2.

8-5-37. C REC Current Adjustment (Metal)

• Setting

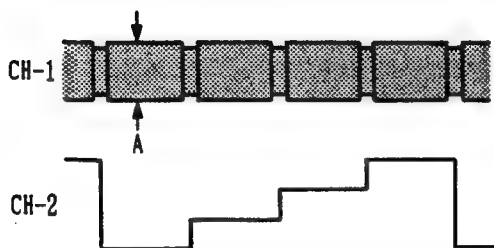
Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
------------------------------------	-------------------------

• Preparation

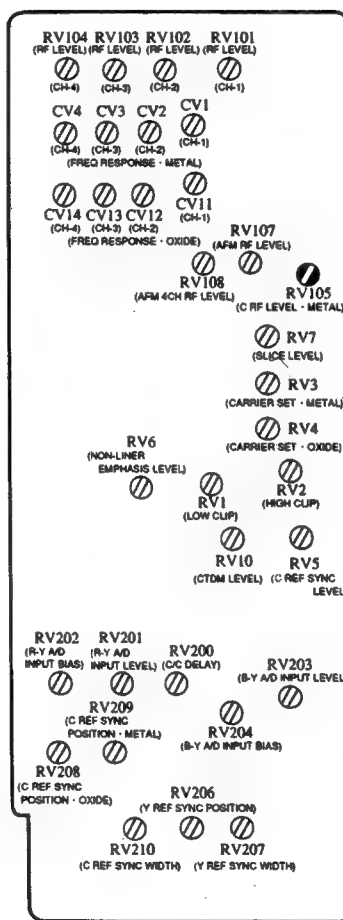
- Input signal: 0% flat field
- Connect a tantalum capacitor (1 to 10 μ F/16V) between TP35 and TP1, TP36 and TP2 on the Extension board. (TP1 and TP2 negative).
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

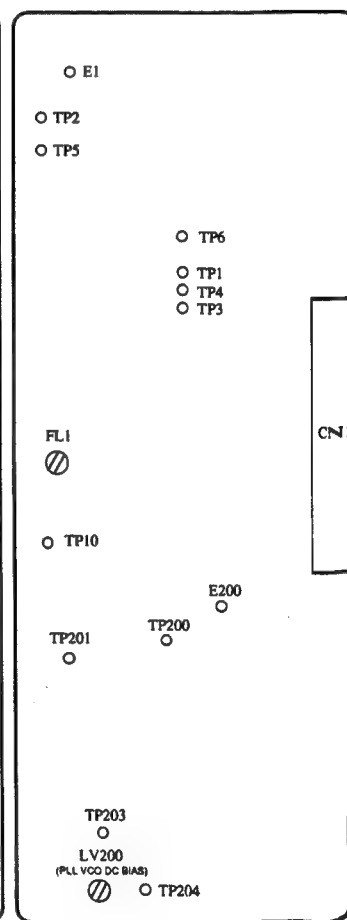
- Test point : CH-1 : TP46;Extension board
CH-2 : TP8;Extension board
- Adj. point : \odot RV105 (C RF LEVEL METAL);VDA-11/11P
- Spec. : Adjust so that A is two times as high as the level of head ① which is set in Step 4 of Sec. 8-5-32 C REC Current Adjustment (Oxide).



Note: The each level of the head ① through ④ should be less than 1.0V.



VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

8-5-38. C Frequency Response Check (Metal)

• Setting

Equipment: Waveform Monitor:	Board:
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• Preparation

- Calculate the calibration value on the standard player (equivalent to BVW-75/75P).
Calibration Value = (Chart 1) - (CR5-1B playback level For NTSC)
(CR5-1BPS playback level ... For PAL)

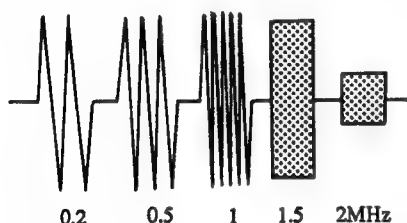
	NTSC	PAL
0.5 MHz	100%	100%
1.0 MHz	100%	100%
1.5 MHz	86%	85%

Chart 1

- Input signal: Multi burst signal
- Insert the blank tape (BCT-20M) to BVW-D600/D600P. Then put the unit into REC mode about 80 seconds.

• Adjustment procedures

CAV R-Y OUT/BVW-75/75P (or equivalent)
CAV B-Y OUT/BVW-75/75P (or equivalent)



Specification

	NTSC	PAL
frequency	level	level
0.2 MHz	100% (REFERENCE)	100% (REFERENCE)
0.5 MHz	(100-Calibration value) $\pm 5\%$	(100-Calibration value) $\pm 5\%$
1 MHz	(100-Calibration value) $\pm 5\%$	(100-Calibration value) $\pm 5\%$
1.5 MHz	(86-Calibration value) $\pm 5\%$	(85-Calibration value) $\pm 5\%$

- The level differences between the fields at 1.5 MHz should be within 7.5% respectively.
- Repeat 8-5-36. C REC current frequency response adjustment (METAL) and 8-5-37. C REC current adjustment (METAL) so that the specification is met.

8-5-39. C REF Sync Position Tentative Adjustment (Metal)

• Setting

Equipment: Dual Trace Oscilloscope

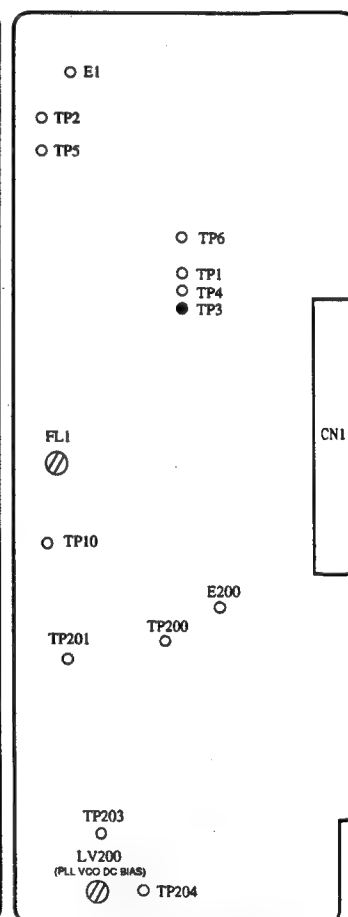
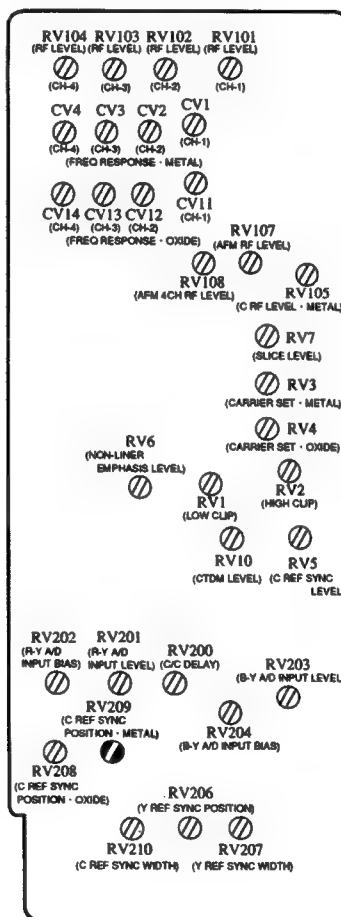
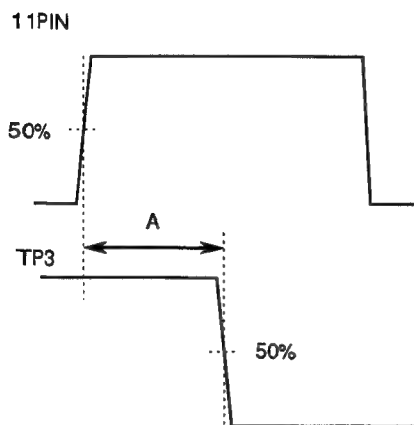
Board: VDA-11/11P board

• Preparation

- Input signal: MOD pulse and bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP11;Extension board
TP3;VDA-11/11P
- Adj. point : ● RV209 (C REF SYNC
POSITION METAL);VDA-11/11P
- Spec. : $A = 670 \pm 10 \text{ nsec}$



8-5-40. C REF Sync Position Tentative Adjustment (Oxide)

• Setting

Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
------------------------------------	-------------------------

• Preparation

<ul style="list-style-type: none"> • Input signal: MOD pulse and bar • Insert the BCT-20G and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP11;Extension board
TP3;VDA-11/11P
- Adj. point : ● RV208 (C REF SYNC
POSITION OXIDE);VDA-11/11P
- Spec. : A = 670 ± 10 nsec

11PIN

50%

TP3

A

50%

VDA-11/P BOARD(SOLDERING SIDE)

VDA-11/P BOARD(COMPONENT SIDE)

8-5-41. C/C Delay Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

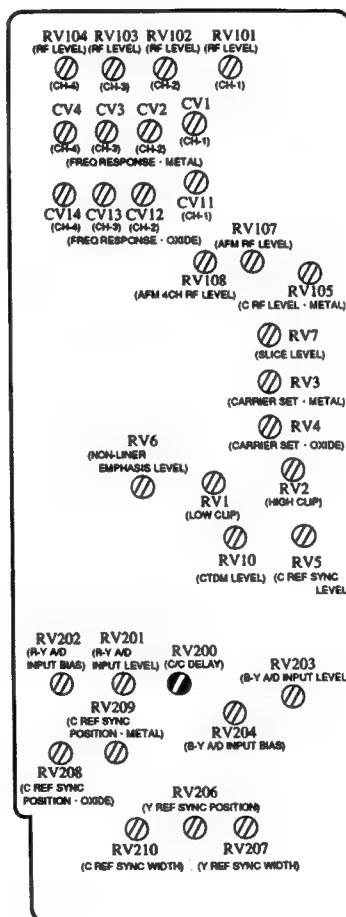
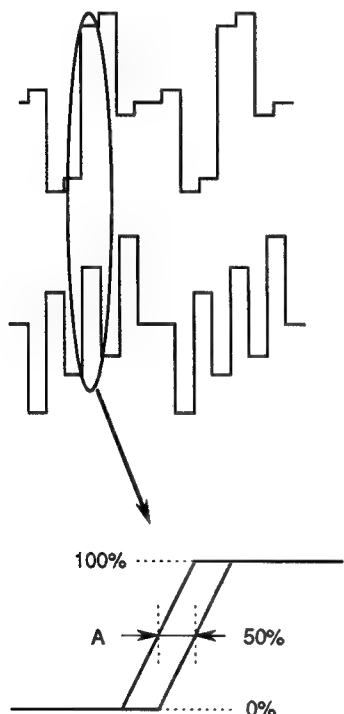
Board: VDA-11/11P board

• Preparation

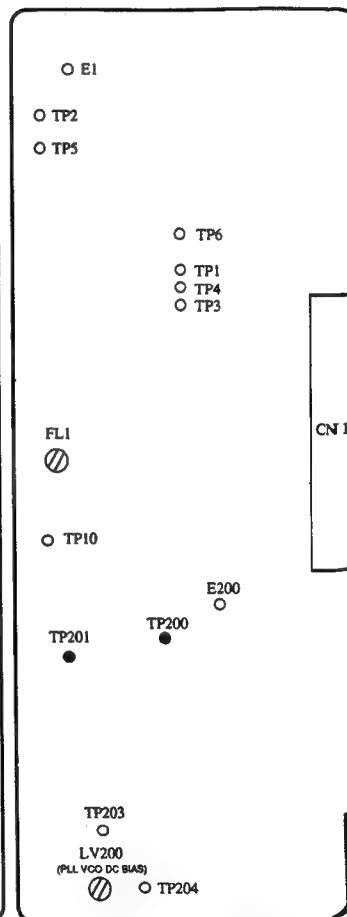
- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP200;VDA-11/11P
TP201;VDA-11/11P
- Adj. point : ● RV200 (C/C DELAY);VDA-11/11P
- Spec. : $A = 0 \pm 5 \text{ nsec}$



VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

8-5-42. Composite Y/C Delay Adjustment (Metal)

• Note

- A standard VTR (BVW-75/75P or the equivalent) which is adjusted to the specified value is used in this adjustment.

Step 1.

Equipment: Dual Trace Oscilloscope

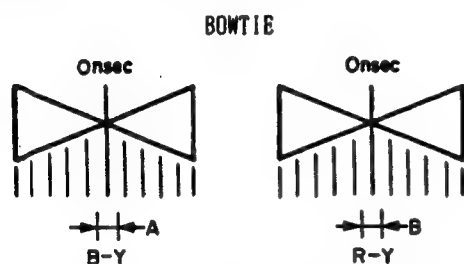
Board: VDA-11/11P board

• Preparation

- Input signal: BOWTIE (TSG-300)
- Insert the BCT-20M and put the unit into the REC mode.
- Play back the recorded tape using a standard VTR player.
- Set the Y/C DELAY control of a standard VTR player to PRESET.

• Adjustment procedures

- Test point : CAV Y
CAV R-Y } OUT/Standard VTR
CAV B-Y } (terminated by 75 ohms)
- Spec. : A, B = ± 10 nsec



1. Check that the cross point of waveform is between A and B.
2. If the specification is not met, check that the chroma signal is advanced or delayed.

Step 2.

• Setting

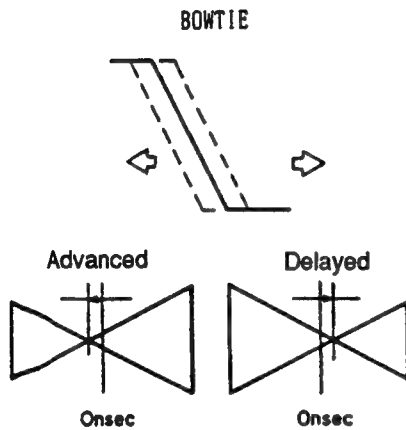
Equipment: Dual Trace Oscilloscope	Board: VDA-11/11P board
------------------------------------	-------------------------

• Preparation

- Input signal: BOWTIE (TSG-300)
- Insert the BCT-20M and put the unit into the REC mode.

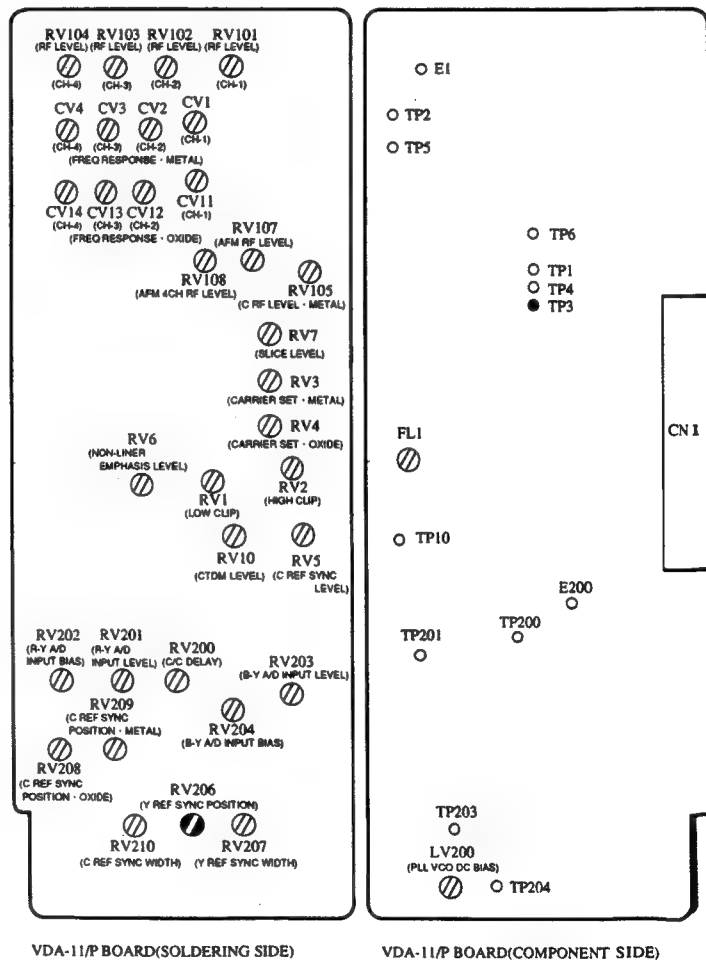
• Adjustment procedures

- Test point : TP3;VDA-11/11P
- Adj. point : ● RV206 (C REF SYNC DELAY METAL);VDA-11/11P
- Spec. :



TRIG:TP17/Extension board

1. When the chroma signal is delayed, correct the REF Sync signal in the right direction.
2. When the chroma signal is advanced, correct the REF Sync signal in the left direction.
3. Adjust Steps 1 and 2 repeatedly until the specification is met.



8-5-43. Composite Y/C Delay Adjustment (Oxide)

- Note

- A standard VTR (BVW-75/75P or the equivalent) which is adjusted to the specified value is used in this adjustment.

Step 1.

- Setting

Equipment: Dual Trace Oscilloscope

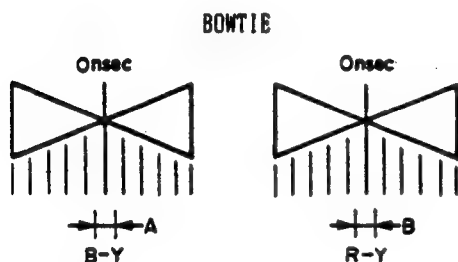
Board: VDA-11/11P board

- Preparation

- Input signal: BOWTIE
- Insert the BCT-20G and put the unit into the REC mode.
- Play back the recorded tape using a standard VTR.
- Set the Y/C DELAY control of a standard VTR to PRESET.

- Adjustment procedures

- Test point : CAV Y
CAV R-Y } OUT/Standard VTR
CAV B-Y } (terminated by 75 ohms)
- Spec. : A, B = ± 10 nsec



1. Check that the cross point of waveform is between A and B.
2. If the specification is not met, check that the chroma signal is advanced or delayed.

Step 2

• Setting

Equipment: Dual Trace Oscilloscope

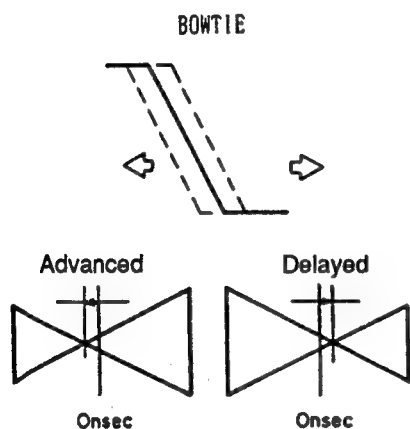
Board: VDA-11/11P board

• Preparation

- Input signal: BOWTIE (TSG-300)
- Insert the BCT-20G and put the unit into the REC mode.

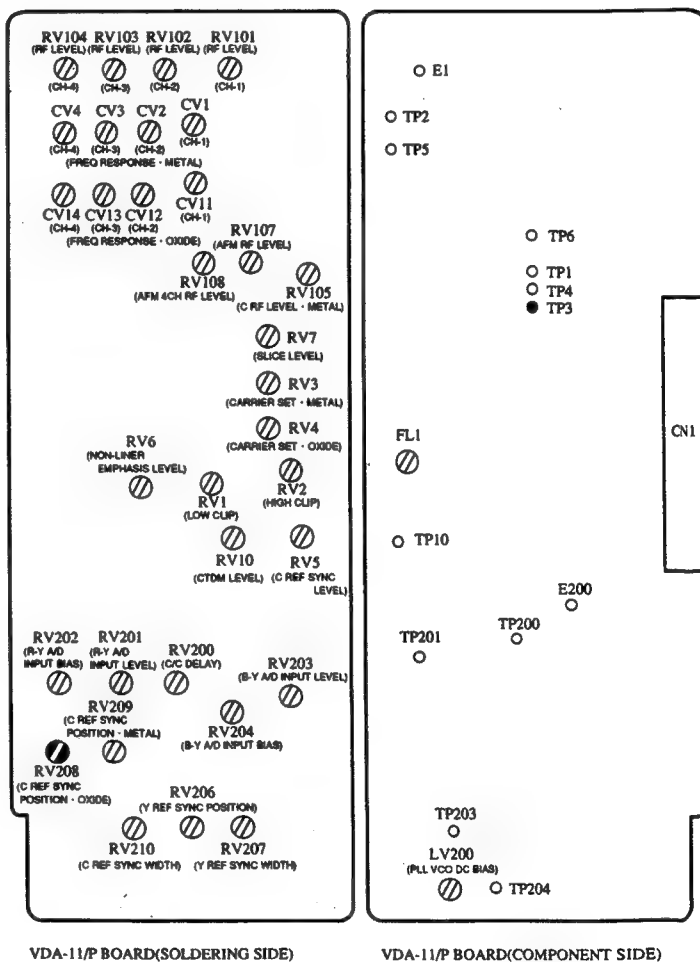
• Adjustment procedures

- Test point : TP3;VDA-11/11P
- Adj. point : ● RV208 (C REF SYNC POSITION - OXIDE);VDA-11/11P
- Spec. :



TRIG:TP17/Extension board

1. When the chroma signal is delayed, correct the REF Sync signal in the right direction.
2. When the chroma signal is advanced, correct the REF Sync signal in the left direction.
3. Adjust Steps 1 and 2 repeatedly until the specification is met.



8-5-44. AFM-RF Balance Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

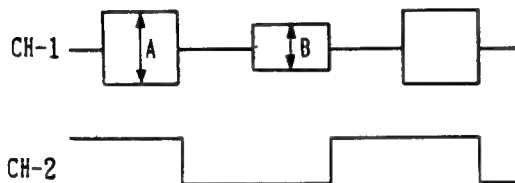
Board: VDA-11/11P board

• Preparation

- AUDIO IN CH-1/CH-2: No signal
- Insert the BCT-20M and put the unit into the REC mode.
- Play back the recorded tape using a standard VTR player (BVW-75/75P or the equivalent).
- REC mode→adjustment
- Play mode→check
- Player CAP Lock Mode "4 FIELD"

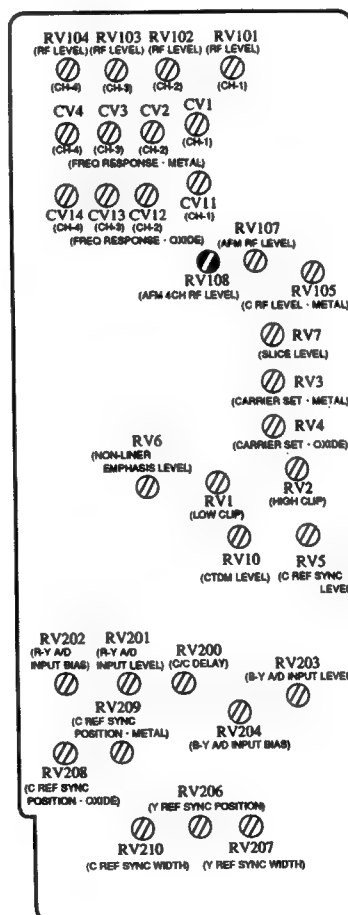
• Adjustment procedures

- Test point : CH-1 : IC602-14;VO-18/18P board:
BVW-75/75P
CH-2 : TP31;EN-48/48P board:
BVW-75/75P
- Adj. point : ● RV108 (AFM 4CH REF LEVEL);VDA-11/11P
- Spec. : $A = B \pm 15\%$

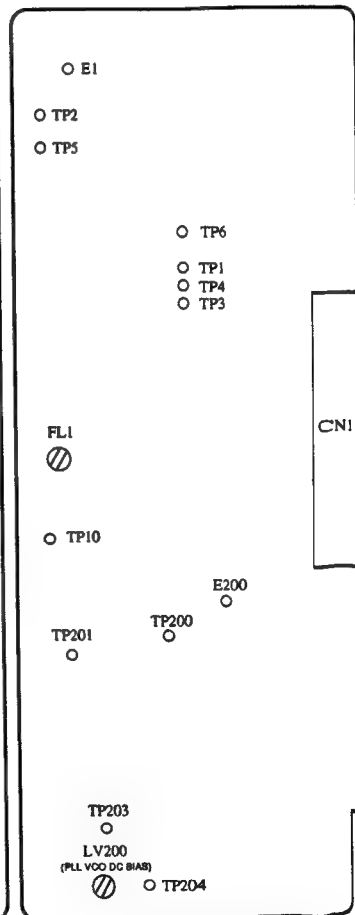


$$A = B \pm 15\%$$

TRIG : CH-2



VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

8-5-45. Y PB RF Level Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

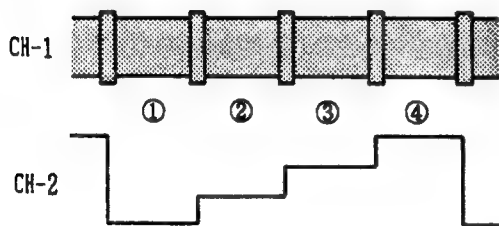
Board: VP-24/24P board

• Preparation

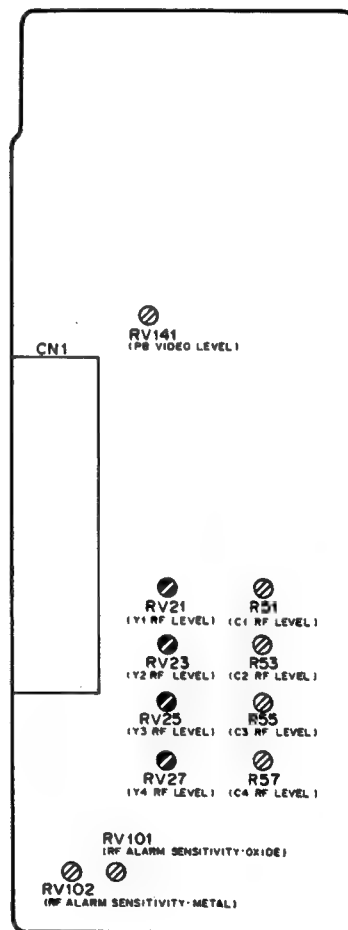
- Play back the flat field signal on the alignment tape.
For NTSC ...CR5-1B
For PALCR5-1BPS
- Make a tracking so that the RF level is maximum.

• Adjustment procedures

- Test point : CH-1 : TP33;Extension board
(Terminated by 75 ohms.)
CH-2 : TP25;Extension board
- Adj. point : ①: ● RV21 (Y1 REF LEVEL);VP-24/24P
②: ● RV23 (Y2 REF LEVEL);VP-24/24P
③: ● RV25 (Y3 REF LEVEL);VP-24/24P
④: ● RV27 (Y4 REF LEVEL);VP-24/24P
- Spec. : A = $220 \pm 20\text{mV}$



TRIG:CH-2



VP-24/24P BOARD (COMPONENT SIDE)

8-5-46. C PB RF Level Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

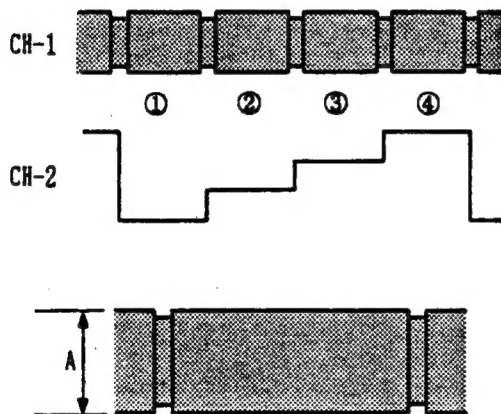
Board: VP-24/24P board

• Preparation

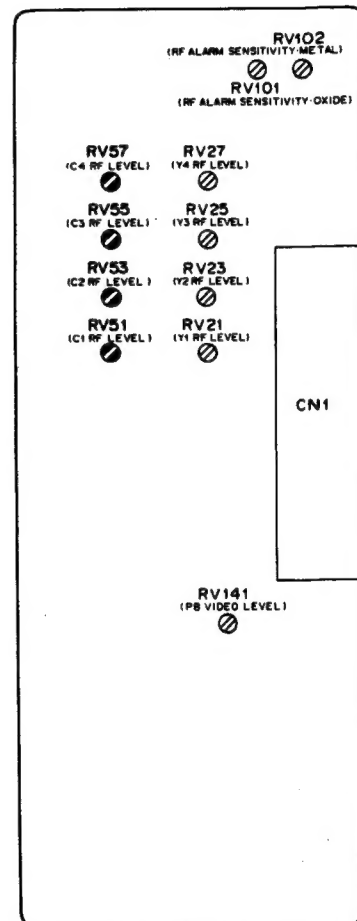
- Play back the flat field signal on the alignment tape.
For NTSC ... CR5-1B
For PAL CR5-1BPS
- Make a tracking so that the RF level is maximum.

• Adjustment procedures

- Test point : CH-1 : TP31;Extension board
(Terminated by 75 ohms.)
CH-2 : TP25;Extension board
- Adj. point : ①: ⓧ RV51 (C1 RF LEVEL);VP-24/24P
②: ⓧ RV53 (C2 RF LEVEL);VP-24/24P
③: ⓧ RV55 (C3 RF LEVEL);VP-24/24P
④: ⓧ RV57 (C4 RF LEVEL);VP-24/24P
- Spec. : A = $220 \pm 20\text{mV}$



TRIG : CH-2



VP-24/24P BOARD (COMPONENT SIDE)

8-5-47. VF PB Output Level Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

Board: VP-24/24P board

• Adjustment procedures

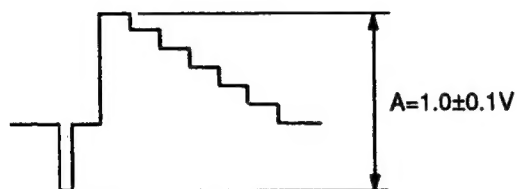
- Test point : TP38;Extension board
- Adj. point : Step 1.
● RV141 (PB VIDEO LEVEL) ;VP-24/24P
- Spec. : For NTSC : $A = 1.0 \pm 0.1V$
For PAL : $A = 1.0 \pm 0.1V$

Step 1.

- Play back the color-bar signal on the following alignment tape.

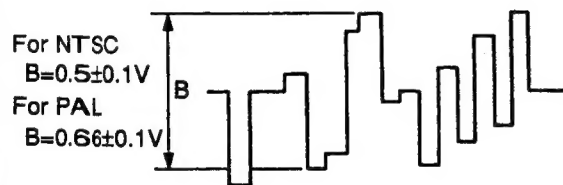
For NTSC : CR5-1B

For PAL : CR5-1BPS

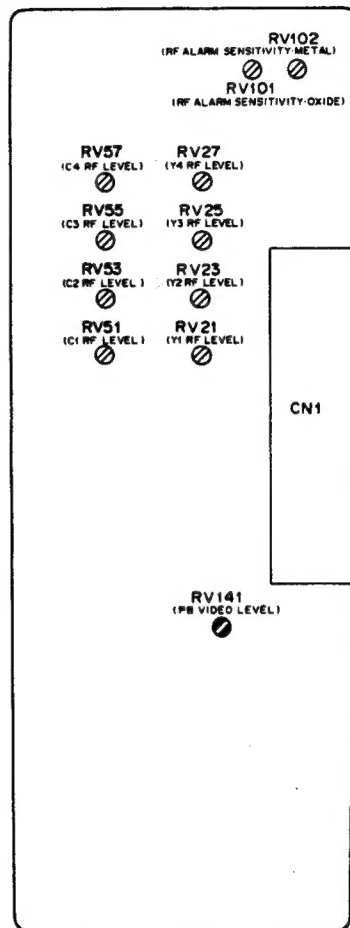


Step 2.

- Press the CTDM button.



Check that level B is $0.5 \pm 0.1 V$ (for NTSC)/ $0.66 \pm 0.1 V$ (for PAL).



VP-24/24P BOARD (COMPONENT SIDE)

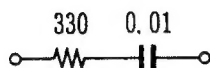
8-5-48. RF Alarm Sensitivity Adjustment

• Setting

Equipment: Dual Trace Oscilloscope

Board: VP-24/24P board

• Chip cord with CR.



• Preparation

- Input signal: built-in color-bar
- Connect the clip cord with CR between TP26 and TP1 on the extension board.

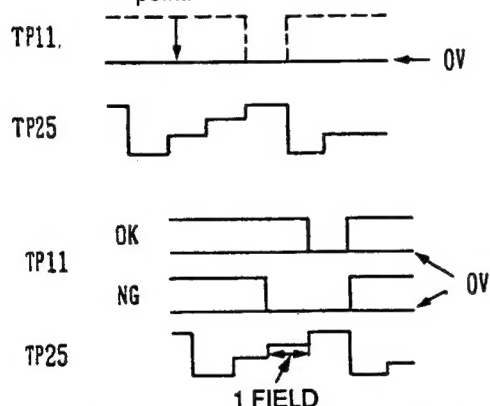
• Adjustment procedures

- Test point : TP11;Extension board:VP-24/24P
TP25;Extension board: VP-24/24P
- Adj. point : • OXIDE adjustment
● RV101(RF ALARM SENSITIVITY): OXIDE;VP-24/24P

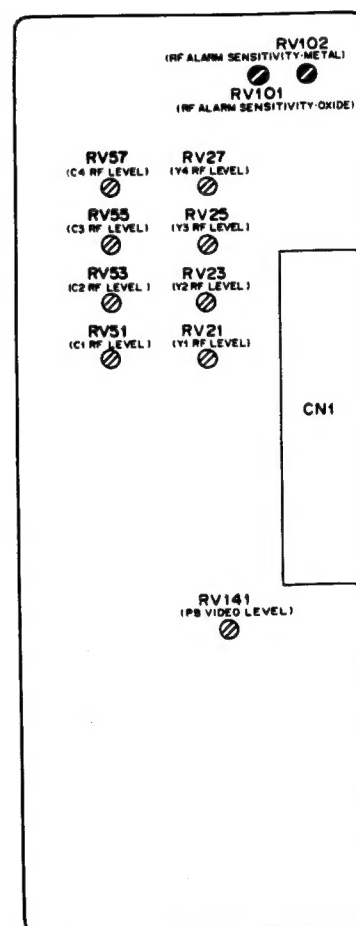
• METAL adjustment

- RV102 (RF ALARM SENSITIVITY): METAL;VP-24/24P

- Spec. : Adjust so that the pulse waveform of the TP11 becomes 0V level point.



1. Insert the BCT-20G and put the unit into the REC mode. (OXIDE adjustment)
2. After OXIDE adjustment, insert the BCT-20M and put the unit into the REC mode. (METAL mode)
3. After adjustment is completed, remove the clip cord.
4. Confirm that the waveform of the TP11 is not fall to 0V in over 2 fields continuously.
If not, readjust the procedures 1~3.



VP-24/24P BOARD (COMPONENT SIDE)

